# Freedom Chemical Spill

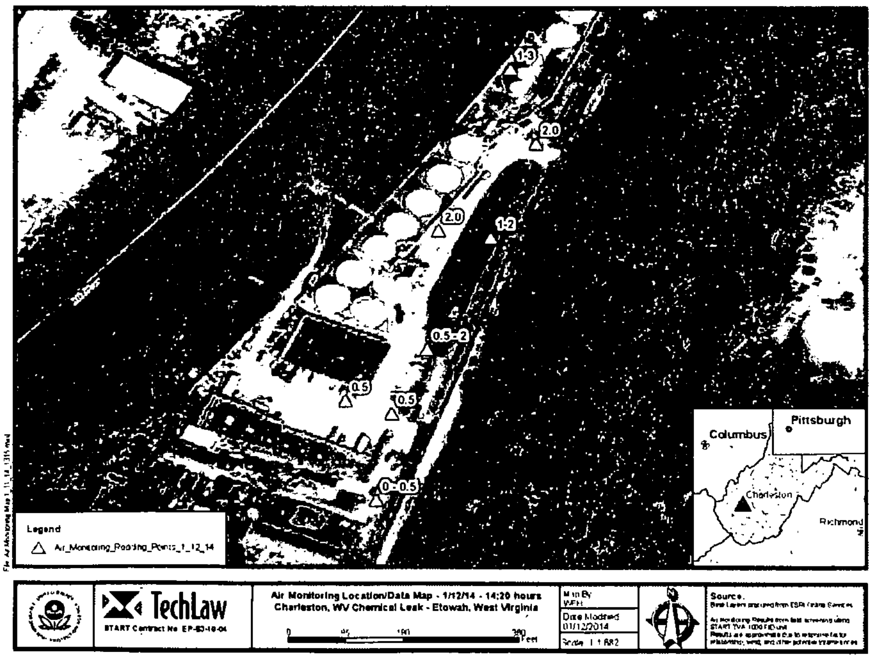
- 1/9 – spill of 4-methylcyclohexane methanol (MCHM) reported to Elk River
- MCHM detected at intake to WV American Water Company Kanawha Valley Plant
  - Did not shut down intake, concern for pressure loss
  - Minimal storage
  - No alternate/emergency source
- Do Not Use Order issued by West Virginia Bureau for Public Health (WVBPH), Governor Tomblin declares State of Emergency
  - 100,000 customers
  - 300,000 service population
  - 9 counties
- Chemists consult to understand MCHM chemistry, analytical approach
- WVBPH consults CDC/ATSDR on MCHM toxicity

# Freedom Chemical Spill

- 1/10/14 – RICT convened; EPA R3 deploys two On Scene Coordinators, staffs FEMA EOC desk (Phila), consults with WVDEP and WVBPH
- 1/12/14 – CDC/ATSDR recommends protective level of 1 ppm MCHM, EPA supports
- 1/12/14 - Flushing of system begins (mains and buildings):
  - 175 pressure zones
  - 1700 miles of mains
  - 3000 square miles
- 1/14 – 1/18/14 – flushing continues, DNU lifted in successive areas of distribution system
- 1/15/14 – CDC/ATSDR advises pregnant women to avoid water out of an abundance of caution
- 1/18/14 - achieved < 1 ppm MCHM throughout system
- 1/21/14 – Freedom Industries reports tank material contained 7.3% propylene glycol phenyl ether (PPH) and di-propylene glycol phenyl ether (di-PPH)

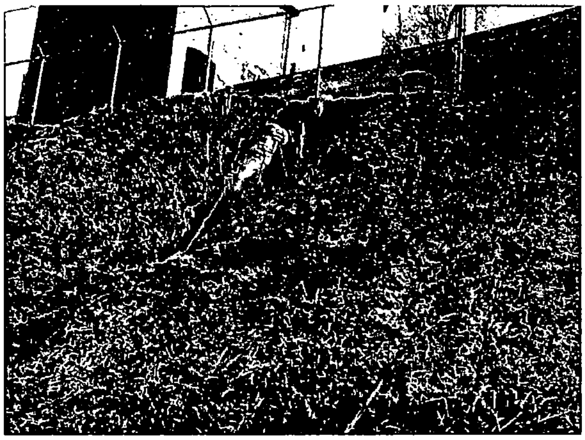
# Freedom Chemical Spill

- 2/5/14 – R3 Administrator and CDC Director visit Charleston, participate in press conference
- 2/11/14 – Gov. Tomblin announces home testing project:
  - Residential water assessment
  - Independently evaluate safety factor for MCHM
  - Development of odor threshold for MCHM
- 2/11/14 – Coal slurry release to Elk River tributary from Patriot Coal processing plant (no impact to drinking water)
- 2/20/14 – <10 ppb throughout system; continue flushing to address odor
- 2/28/14 – State of Emergency ends
- 3/3/14 – all results <2 ppb throughout system




WEST VIRGINIA-AMERICAN WATER COMPANY


HILLSDALE
Hope Cemetery
Bigley Ave
Bigley Ave
Swor Insurance LLC Swor David



Storm drain below the second containment of tank farm

## Example of Fill below Tank Farm

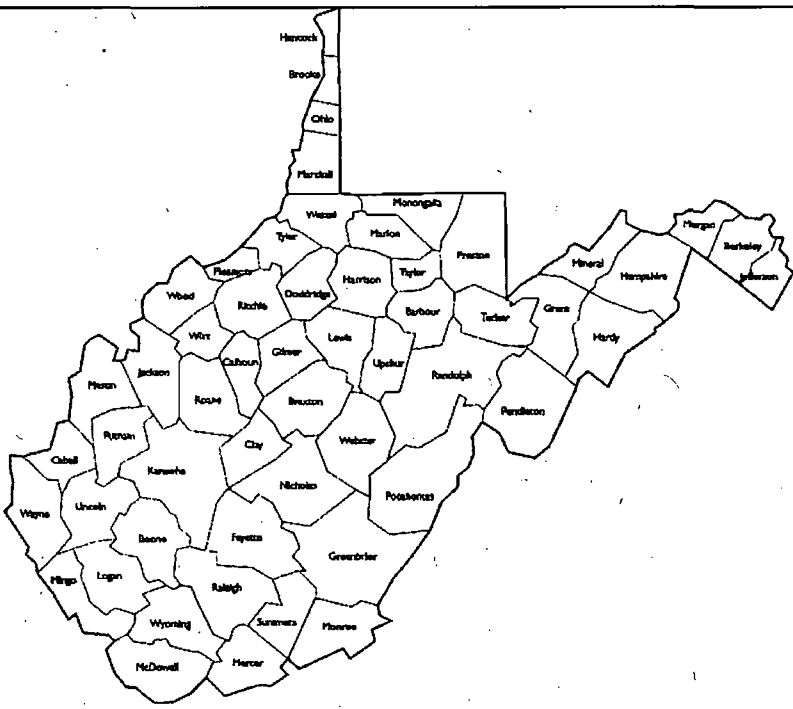
The yellow brick seen in this picture is just one layer of fill used.

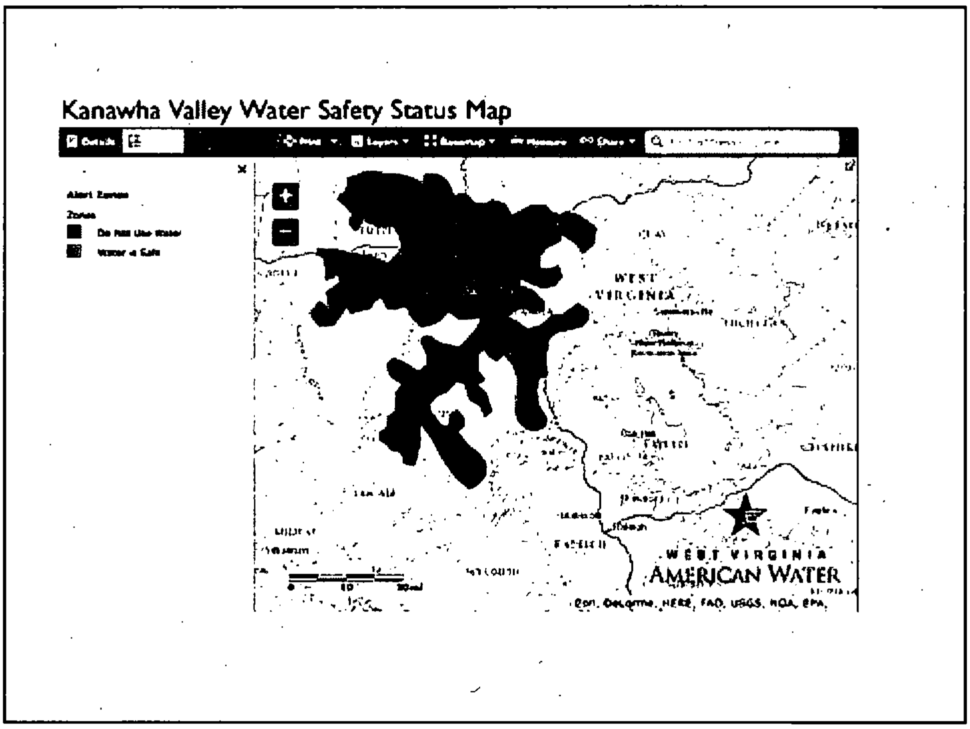
•There is a layer of red brick from demolished buildings

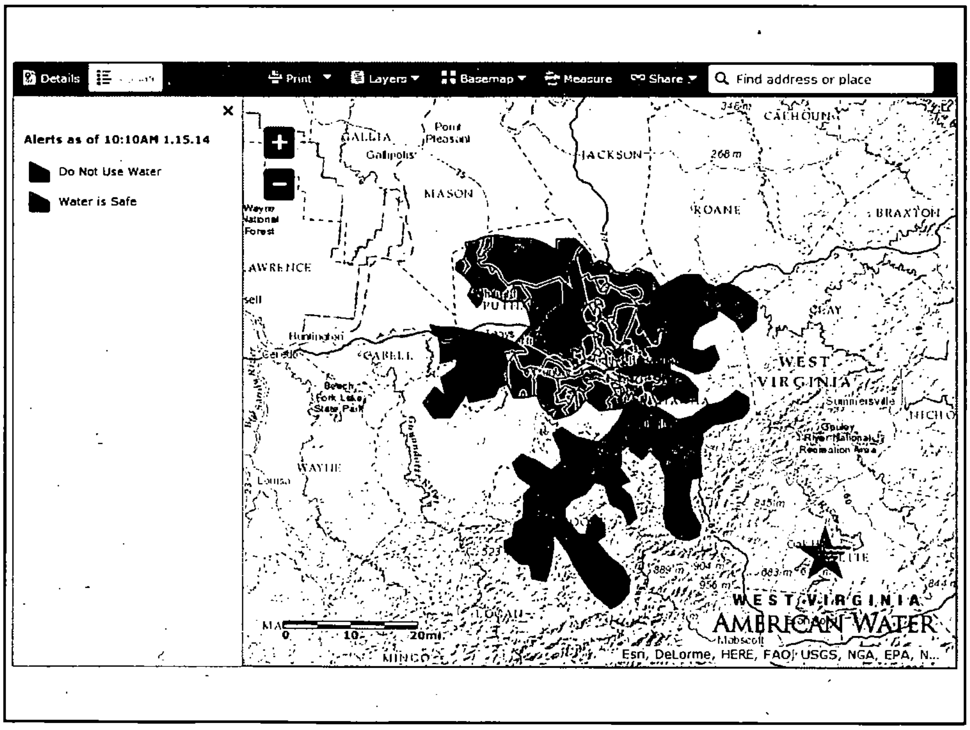
•Some tile from buildings are used

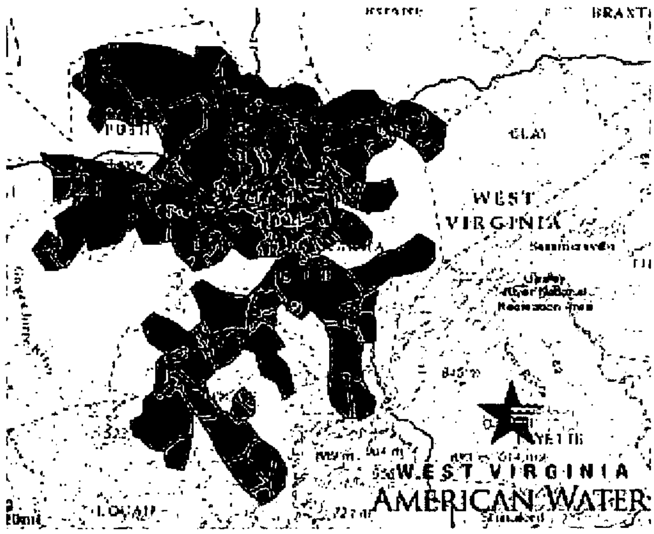
•The secondary containment does have a clay liner below the fill and gravel layers

•Freedom Industries will be drilling two holes to look at what the layers of fill are specifically and the depth of each, once the issue with marking gas lines is resolved.

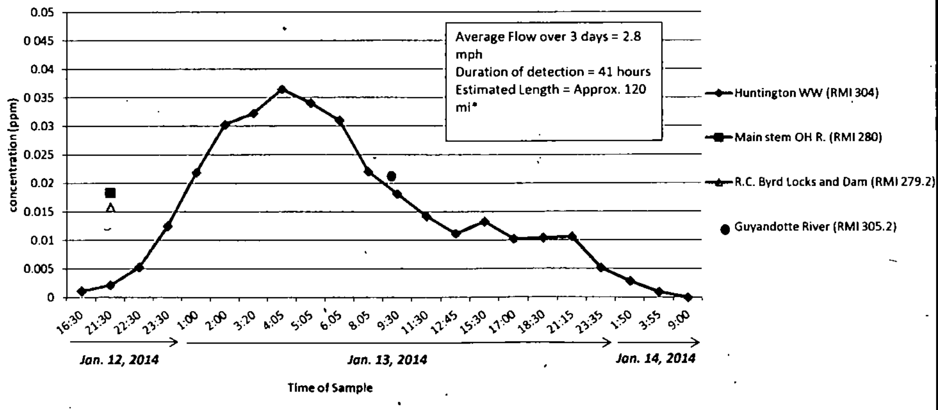


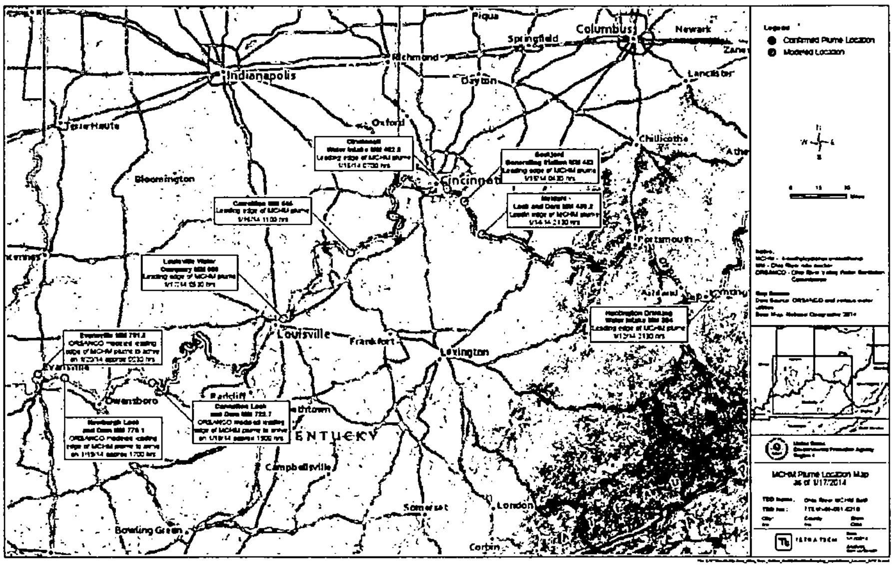

Kanawha Valley Water Safety Status Map
WEST VIRGINIA
AMERICAN WATER


Details
Print
Layers
Basemap
Measure
Share
Find address or place
Alerts as of 10:10AM 1.15.14
Do Not Use Water
Water is Safe
GALLIA
Gallipolis
Point Pleasant
MASON
JACKSON
CALHOUN
ROANE
BRAXTON
Wayne National Forest
LAWRENCE
Huntington
CABELL
WAYNE
WEST VIRGINIA
Summersville
Gauley River National Recreation Area
WEST VIRGINIA
AMERICAN WATER
MINGO
Esri, DeLorme, HERE, FAO, USGS, NGA, EPA, N...




**4-methylcyclohexane methanol**
**Concentrations on Ohio River**




Indianapolis
Richmond
Piqua
Springfield
Columbus
Newark
Dayton
Lancaster
Terre Haute
Oxford
Chillicothe
Bloomington
Cincinnati
Portsmouth
Louisville
Frankfort
Lexington
Owensboro
Radcliff
ENTUCKY
Campbellsville
Somerset
London
Bowling Green
Corbin
Legend
Confirmed Plume Location
Modeled Location
MCHM Plume Location Map
as of 1/17/2014

# Chemical Spill Case Study: Wake-Up Call for Drinking Water Protection

Vicky Binetti

US Environmental Protection Agency

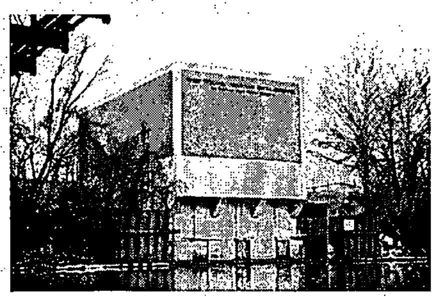
Region III

For Discussion:
Source Water Collaborative
Steering Committee

April 23, 2014

## Case Study—Spill Event

- Release of estimated 10,000 gallons of MCHM* to Elk River discovered 1/9/14
- MCHM detected at intake and post-filters at Kanawha Valley water treatment plant—1½ miles downstream
- Water system already stressed by winter weather issues, determines closing intake would cause pressure loss, compromise sanitation & fire-fighting capacity
- WV American issues Do Not Use instructions to customers
- Governor Tomblin declares State of Emergency affecting 9-county area



*On 1/21/14, est. 750 gals PPH & di-PPH reported to have been in released fluid mixture

## Immediate Chemistry, Toxicology & Logistical Challenges

- Very limited toxicological information available to assess human health risks and aquatic life impacts of MCHM
- CDC/ATSDR advises WV Bureau for Public Health, develops provisional health protection screening level for short-term MCHM exposure (1 ppm)
- Quantitative analytic methods developed collaboratively (industrial, water, public health sectors)
- Numerous laboratories engaged and trained to analyze distribution system water samples with rapid turnaround
- National Guard organizes sampling and analysis effort, bottled and bulk water distribution in 3,000-sq mi service area

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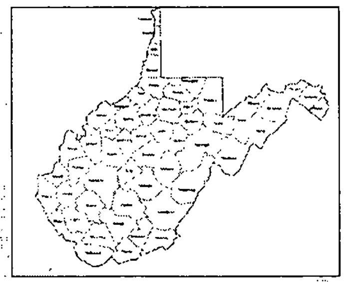
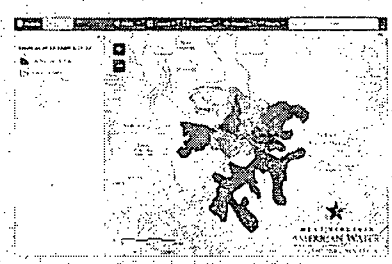
* CDC/ATSDR later develops screening level of 1.2 ppm for PPH and di-PPH



## Response Actions and Reactions



- WV American conducted aggressive flushing program to clear system (MCHM < 1 ppm)
- Customers instructed to flush premise plumbing as pressure zones were cleared & Do Not Use status was sequentially lifted
- Sampling results:
  - <1 ppm throughout system by 1/18/14
  - < 0.010 ppm by 2/20/14
  - < 0.002 ppm by 3/3/14
- Characteristic MCHM odor threshold much lower than health-based target levels, resulting in continuing customer concern
- State of Emergency ends 2/28/14



## Answers to Frequently-Asked Questions

- Source water assessment completed by WV BPH in 2002:
  - identified site as potentially significant source of contaminants (at the time, characterized as a petroleum manufacturing site)
  - recommended next steps in source protection planning, including Contingency Plan, Alternative Source plan, and Management Plan
  - 2006 update by WVAWCo outlined activities associated with emergency/contingency planning
- Regulatory coverage of above-ground storage tank through NPDES stormwater permit (general permit)
  - Secondary containment existed, was compromised
- Sampling results published to website on daily basis
- MCHM has specialized and relatively broad use, but information is lacking on toxicology and some aspects of chemistry



## Response Actions and Reactions (continuing)

- Governor announces Tap Assessment Project (WV TAP) 2/11/14
  - Residential sampling program
  - Independently evaluate toxicology information, safety factor
  - Development of MCHM odor threshold
- Governor signs Water Resources Protection Act – 4/1/14
- Drinking water system monitoring continues, and sampling occurs as follow-up to customer complaints
- Customer concerns persist about water safety and potential health impacts
- Business, industry and government have suffered financial impacts
- Social impacts include disruption in normalcy, basic services, routine; loss of confidence in public institutions and services

## WV Water Resources Protection Act

- Requires updated source water protection plans for water systems with surface water intakes (or surface water influenced surface water) by 7/1/16, to include:
  - Public engagement
  - Response plan to contamination of supply
  - Assessments of current and potential water storage capacity; alternative sources/intakes/emergency inter-connections; ability to close intake, duration
  - List of potential sources of significant contamination within zone of critical concern (provided by WV DEP, WV BPH, and WV DHSEM)
  - Feasibility of implementing an early warning system monitoring system
- Bureau for Public Health to hold public hearing; act on each source water protection plan within 180 days of submittal
- Systems must update plans every 3 years
- Utility monitoring for highest risk contaminants in water supply: salts or ions; metals; polar organics; nonpolar organics; VOCs; oils & other hydrocarbons; pesticides; biotoxins



## WV Water Resources Protection Act (cont'd)

- Potential study of long-term health effects of exposure
- Creates requirements for above-ground storage tanks (>1320 gallons, with some exemptions)
  - Inventory and registration of all ASTs (location, capacity, age, distance to well/intake); identify applicable existing requirements
  - State to develop AST program, including standards/requirements for design, construction, maintenance, leak detection, reporting, and corrective action; annual inspections; spill prevention response plan

## Considerations for Source Water Protection
### *"Now that we have your attention…."*

- Demonstrated fundamental dependence on safe water for health, normal community functions/operations (e.g., hospitals, schools), commerce, security
- Source water quality is basic raw material & can't be taken for granted
- Consider source water assessments/protection plans living tools
  - changes from baseline, newer tools & technology
  - Use all tools available (GIS, databases, communications)
  - Search wide, dig deep; consider regulated & unregulated sources
  - Collaborate, share information at all levels
- Establish protection priorities (e.g., geography, threat, sector)
- Consider "what if" scenarios in protection strategies, response and contingency plans

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## Starting the Brainstorm: Potential SWC Actions

- Develop case study synopses to illustrate impacts and costs when contaminants impact water quality (include catastrophic and routine, less notorious examples)
- Emphasize value of collaboration at multiple levels (local, state), and beyond CWA-SDWA Toolkit (RCRA, Superfund, EPCRA, etc.)
- Enhance "How-to-Collaborate" Toolkit with examples of specific actions to achieve protection (e.g., BMPs, chemical inventories and water treatment options, communication networks, etc.)
- Investigate potential effort/campaign with/for specific target groups (utilities, local governments, LEPCs)
- Investigate broad-based threats with potentially significant risk (e.g., transportation, pipeline integrity) – white papers?

10

Ex. 5 - Deliberative

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Meeting and Event Centers

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ds

3 Tbsp cold butter, cubed
1 Tbsp olive oil
1 lb bacon, chopped
2 large yellow onions, thinly sliced
1½ cups Gruyère cheese, shredded
1½ cups farmer's cheese, shredded
Sour cream, for topping
Finely chopped chives, for topping

**DIRECTIONS**

**For pierogi dough:**

1. Combine egg, sour cream, butter, chives, and salt with your hands in a bowl. Don't worry if mixture is not uniform and, as with pie dough, don't overwork it. Add flour and mix with your hands until a dough forms. Wrap in plastic and refrigerate the dough at least 2 hours or up to 2 days.

**For lasagna:**

1. Put potatoes in a large pot and cover with 2 inches cold water. Bring to a boil. Season water generously with salt. Reduce heat to maintain a simmer and cook until a knife easily pierces potatoes. Drain and return potatoes to same pot. Mash, slowly mixing in hot cream and cold butter. Season with salt and pepper to taste and set aside.
2. Warm olive oil in a large skillet over medium-high heat. Cook bacon until crisp, about 10 minutes. Transfer to a plate with a slotted spoon.
3. Reduce heat to medium, toss onions into pan, and coat with bacon fat. Season with salt and pepper. Cook, stirring frequently, until onions are caramelized and sweet. Let cool.
4. Butter a casserole dish. Preheat oven to 350°F.
5. Roll pierogi dough out with a rolling pin to a ⅛-inch thick rectangle. Cut into 4-inch by 13-inch strips, re-rolling scraps as necessary. You will need 14 to 20 strips.
6. Have mashed potatoes, crisp bacon, caramelized onions, pasta strips, and cheeses ready on a work surface. Arrange 1 layer pierogi dough strips on bottom of buttered casserole dish, slightly overlapping edges of strips. Spread a ½-inch layer of potatoes on top of dough. Top with some

# Ex. 5 - Deliberative

Ex. 6 - Personal Privacy

# Ex. 5 - Deliberative

# Ex. 5 - Deliberative

EAS
Joan A.

# Ex. 5 - Deliberative

Ex. 5 - Deliberative

Ex. 5 - Deliberative

# Ex. 5 - Deliberative

# Ex. 5 - Deliberative

**binetti, victoria**

**From:** Caporale, Cynthia
**Sent:** Wednesday, March 05, 2014 8:54 AM
**To:** binetti, victoria; Arguto, William
**Subject:** FW: use of data sets from WV

Do you think I need to involve ORC to come up with an agreement??

**From:** Gianato, Jimmy J [mailto:Jimmy.J.Gianato@wv.gov]
**Sent:** Tuesday, March 04, 2014 7:53 PM
**To:** Caporale, Cynthia
**Cc:** Markham, Peter G; Goodwin, Amy S; Foreman, Sherri
**Subject:** use of data sets from WV

Ms. Caporale:

WV will be glad to share the information we have with EPA. We would like an agreement with EPA to use the information only for the purpose intended. Any further sharing would have to be approved by the State.

In addition, we would ask that any information or studies derived from this information be provided and discussed with the State prior to any public release or disclosure.

If you agree, please let me know and we will instruct the lab to provide the information.

**Jimmy Gianato**
**Director/Homeland Security Advisor**
West Virginia Division of Homeland Security
and Emergency Management
**1900 Kanawha Blvd, E**
**Building 1 Room EB -80**
**Charleston, WV 25305**
**(304) 558-5380 office (304) 541-9990 cell**
**jimmy.j.gianato@wv.gov**
**HSDN jimmy.gianato.sle@dhs.sgov.gov**
www.dhsem.wv.gov

Classification: UNCLASSIFIED
Caveats: NONE

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**THOMPSON BARNEY**

2030 KANAWHA BOULEVARD, EAST
CHARLESTON, WEST VIRGINIA 25311
TELEPHONE: 304.343.4401
FACSIMILE: 304.343.4405

January 13, 2013



Dennis P. Farrell, President
Freedom Industries, Inc.
1015 Barlow Drive
Charleston, West Virginia 25311

**VIA CERTIFIED MAIL**

James P. Roberts, President
Eastman Chemical Company
200 South Wilcox Drive
Kingsport, Tennessee 37662

**VIA CERTIFIED MAIL**

Jeffrey McIntyre, President
West Virginia American Water Corporation
1600 Pennsylvania Avenue
Charleston, West Virginia 25311

**VIA CERTIFIED MAIL**

Gary Southern
Post Office Box 713
Charleston, West Virginia 25328

**VIA CERTIFIED MAIL**

Secretary Randy C. Huffman
WV Department of Environmental Protection
601 57th Street, SE
Charleston, West Virginia 25304

**VIA CERTIFIED MAIL**

Shawn M. Garvin, Administrator
US EPA Region III
1650 Arch Street
Philadelphia, Pennsylvania 19103

**VIA CERTIFIED MAIL**

***Re: Federal and Statute Statutory Notice of Intent to Bring Suit Against Freedom Industries for the Toxic Release Discovered on January 9, 2014***

Dear Representatives:

Please be advised that my firm represents Vantap, LLC, John Sarver, Nitro Car Care Center, LLC, Carolyn Burdette, Colours Salon & Boutique, LLC, Crystal Goode and Del. Michael Manypenny. For the purposes of this letter, they may all be contacted through my office at the above-listed address. They all have been exposed to the contaminated water related to the leak from Freedom Industries, LLC that was discovered on January 9, 2014.

The purpose of this correspondence is to serve Notice upon the above-listed entities and individuals that our clients intend to add claims under the statutes listed below to their suit alleging that the leak of 4-MCHM negatively impacted the environment resulting in contaminated drinking water, threats to human health, disruption expenses, water replacement costs, lost profits and wages. Our clients intend to seek appropriate injunctive relief to ensure remediation of the integrity of the water supply in the affected area, as well as to ensure that the situation does not recur in the future.

This Notice is filed pursuant to the Citizen Suit and Private Right of Action provisions of the following federal and state statutes: the Resource Conservation and Recovery Act., 42 U.S.C. §§ 6901, *et seq.* ("RCRA"); the Comprehensive Environmental Response Compensation and Liability Act, 42 U.S.C. §§ 9601, *et seq.* ("CERCLA"); the Superfund Amendment and Reauthorization Act of 1986. Pub. L. No. 99-499 (codified as amended in scattered sections of the United States Code) ("SARA"); the Emergency Planning Community Right To Know Act, 42 U.S.C. §§ 11001, *et seq.*; The Clean Water Act, 33 U.S.C.S. 1251, *et seq.* ("CWA"); the Safe Drinking Water Act, 42 U.S.C.A. §§ 300f to 300j ("SDWA"); the Toxic Substances Control Act, 15 U.S.C. §§ 2601-2692 ("TSCA"); the Rivers and Harbors Act of 1899, 33 U.S.C.A. §§ 401 *et seq.*; the Clean Air Act, 42 U.S.C.A. §§ 7401 *et seq.* ("CAA"); the West Virginia Air Pollution Control Act, West Virginia Code § 22-5-1 *et seq.*; the West Virginia Water Pollution Control Act, West Virginia Code § 22-11-1 *et seq.*; the West Virginia Groundwater Protection Act § 22-12-1 *et seq.*; and the West Virginia Hazardous Waste Management Act, West Virginia Code § 22-18-1 *et seq.*

On January 9, 2014, about 300,000 West Virginians lost their access to a safe water supply after the discovery of a spill of a coal processing chemical from a facility owned and operated by Freedom Industries, LLC, upstream from the West Virginia-American Water Corp. water treatment plant. The chemical, 4-methylcyclohexane methanol and commonly referred to as 4-MCHM spilled into the Elk River just above its confluence with the Kanawha River in downtown Charleston. 4-MCHM is a combination of two very dangerous chemicals known to cause cancer and other adverse effects, but the MSDS sheets issued by the manufacturer, Eastman Chemical Company, ignore and hide the extensive scientific information known showing the risks of the chemical's carcinogenic and highly toxic component parts. 4-MCHM is water soluble. When 4-MCHM breaks down in the environment, its components are released making essential adequate and fair warning about the true dangers of 4-MCHM once it hits the environment. The foreseeable risks of harm posed by 4-MCHM could have been reduced or avoided by reasonable instructions or warnings; their omission renders the product not reasonably safe. Exposure to the 4-MCHM in the environment through human pathways has created a need for a medical monitoring program to protect the public from the risks of 4-MCHM.

Had Freedom Industries, LLC, not breached its duties under statutory and common law, the leak would have never occurred. Furthermore, West Virginia American Water Corporation should have recognized the risk presented by this facility's presence just upstream from their intake, and should have determined what chemicals were being used and assessed the risk they presented to the water supply.

Airborne release of 4-MCHM from the facility of Defendant Freedom Industries caused chemical air pollution resulting in ambient concentrations well above the odor threshold for the chemical over an area of several square miles and over a time period of several days after the January 9, 2014 release. Two component parts of 4-MCHM are methylcyclohexane and methanol which are both known dangerous and toxic chemicals that can cause latent dread disease such as cancer. Extensive medical, epidemiological and toxicological studies show the cancer and non-cancer risks of hexane and methanol. The known risks of exposure to the 4-MCHM components were not disclosed by Eastman. Eastman failed to warn of the likely toxicity of 4-MCHM or its known toxic constituent chemicals.

Further, the chemical in question is known to cause damage to the liver and kidney as well as other organ systems. The citizens making this complaint experienced discomfort upon breathing the air and using the water for hygiene purposes. This chemical is fatal at high doses but has a number of frightening side effects including potential fertility or unborn child negative health impacts. This chemical is also known hydrohexatoluene. Although the IARC has not studied this particular chemical, it contains a benzene chain and those are known to contribute to cancer.

While this Notice is pending over the next sixty (60) days, we will continue to study the pathways, fate, transport, chemical properties and potential human health consequences of the chemical in question although it is abundantly clear that a release occurred in a concentration sufficient to impact negatively human receptors as is shown by the nausea and dermal effects exhibited by numerous citizens in the affected area.

The citizens delivering this Notice have filed a Class Action Complaint alleging statutory claims for compensation for damages as well as claims sounding in tort and property and in sixty (60) days intend to add claims under the above-listed statutes as additional causes of action upon which relief may be granted to the extent appropriate. This Notice letter is intended to satisfy any pre-suit notification requirements under the listed statutes. Pursuant to the statutes listed above, my clients specifically demand that the Freedom Industries site be remediated by the "dig, haul and confirm" or other appropriate method, that West Virginia American Water complete a proper risk assessment of upstream threats to the water supply and that Eastman Kodak conduct the necessary scientific work to bring their MSDS sheets into accordance with accepted scientific literature, opinions and techniques.

Thank you for your attention to and cooperation in this matter. I hope that we can work together to mitigate the negative effects on the community of this dangerous public health hazard. Should you have any further questions or concerns, please do not hesitate to contact me.

Sincerely,

Kevin W. Thompson

Ex. 5 - Deliberative

Charleston Daily Mail
charlestondailymail.com

March 3, 2014

# Changes to chemical spill bill discussed

by **Dave Boucher**
Daily Mail Capitol Bureau Chief

CHARLESTON, W.Va. --Progress was slow Sunday evening as lawmakers tried to finish a bill created in the wake of the Freedom Industries chemical spill days before the end of the Legislative session.

As of 7 p.m. members of the House Judiciary Committee had proposed more than 40 amendments to the already heavily changed Senate Bill 373.

After a 105-minute delay before the meeting, and three hours of discussions, the committee had discussed about 10 amendments.

Members did adopt the newest version of the bill, as well as several amendments.

An amendment proposed by Stephen Skinner, D-Jefferson, that was meant to address citizen lawsuits failed.

"It allows the citizens to sue a company like Freedom, and force it to comply with... the law," Skinner said.

The change would have given a private citizen the legal standing to sue any company violating the provisions of the bill.

It would also have permitted citizens to sue the state Department of Environmental Protection and force the agency to enforce the bill. It failed by a 15-10 vote. Delegate J.B. McCuskey, R-Kanawha, was the only delegate among the five on the committee from Kanawha County to vote "no."

An adopted amendment requires facility owners to keep maintenance logs on tanks. The logs would include the amount of chemicals being stored, any changes to those levels, additives and other information.

The company would have to provide that information to the DEP upon request Skinner proposed the amendment and said he thinks any legitimate business probably keeps that information anyway.

There were questions from the DEP and other officials whether Freedom Industries, the owner of the tank that leaked at least 10,000 gallons of chemicals into the Elk River in January, had enough accurate information about what it was storing.

Another change requires specific maintenance schedules over the life of a tank. Skinner, Meshea Poore, D-Kanawha, and Mike Mannypenny, D-Tyler, sponsored that amendment.

After the amendment was delayed, Chairman Tim Manchin, D-Marion, brought it up for a voice vote. He determined the amendment had passed, eliciting groans from several members.

Skinner, along with other delegates, proposed another amendment that addressed potential issues with tank sizes. The definition of an aboveground storage tank in the bill includes, among many other qualifications, that it be at least 1,320 gallons.

Skinner's amendment would have required companies that move chemicals from tanks of that size to smaller ones still be regulated under the bill. That amendment failed.

In its original form, the bill created a new regulatory framework for aboveground storage tanks and increased emergency preparedness measures.

It still includes increased regulations and the emergency procedures. It also requires the DEP to issue permits and conduct annual inspections of sites that sit near public water sources.

Manchin said Friday he planned to put the bill up for a vote Sunday evening. It still needs to go to the House Finance Committee, and the Senate must agree to changes before it could go to Gov. Earl Ray Tomblin's desk for final approval.

If the Senate doesn't agree with the changes, each chamber will need to pick lawmakers to participate in a conference committee. The committee would then need to agree on any additional changes.

The regular legislative session ends Saturday night.

Poore and about 20 other delegates sent a letter to Tomblin requesting he consider allowing lawmakers to continue working on the bill during the now-routine "budget week," an extended session that comes the week after the regular session.

Speaker Tim Miley, D-Harrison, said he didn't think there would be a need for a special session. He criticized the letter last week, but said in a followup statement he misunderstood the goal of the letter.

"To the extent I perceived that any delegate lacked such a desire or purpose is the result of misunderstanding and miscommunication internally," Miley said in a news release.

"It is now clear that I was unnecessarily concerned."

Senate President Jeff Kessler, D-Marshall, and other senators do not think a special session on the bill is necessary. Earlier in the year they questioned whether Miley was trying to delay action by sending it to three committees.

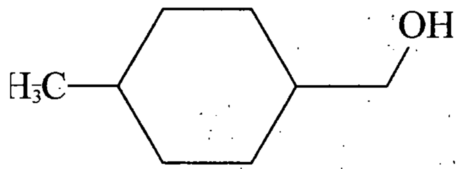
Known as a "triple reference," the move has traditionally been seen as a way to keep legislation from passing. Miley and many delegates denied the claim, saying they wanted a thorough review of the bill.

Tomblin hasn't said whether he would include a discussion of the bill during any extended or special session. He did officially end the state of emergency Friday.

The state of emergency was enacted hours after officials discovered the spill had contaminated drinking water in nine counties. It remained in effect more than 50 days.

*Contact writer Dave Boucher at 304-348-4843 or david.boucher @dailymailwv.com. Follow him at **www.Twitter.com/Dave_Boucher1**.*

EPI Suite Results For CAS



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SMILES : OCC1CCC(C)CC1
CHEM   :
MOL FOR: C8 H16 O1
MOL WT : 128.22
------------------------------ EPI SUMMARY (v4.00) --------------------------
Physical Property Inputs:
Log Kow (octanol-water):   ------
Boiling Point (deg C)  :   ------
Melting Point (deg C)  :   ------
Vapor Pressure (mm Hg) :   ------
Water Solubility (mg/L):   ------
Henry LC (atm-m3/mole) :   ------

Log Octanol-Water Partition Coef (SRC):
Log Kow (KOWWIN v1.68 estimate) =  2.55

Boiling Pt, Melting Pt, Vapor Pressure Estimations (MPBPVP v1.43):
Boiling Pt (deg C):  203.74  (Adapted Stein & Brown method)
Melting Pt (deg C):  -11.99  (Mean or Weighted MP)
VP(mm Hg,25 deg C):  0.0588  (Mean VP of Antoine & Grain methods)
VP (Pa, 25 deg C) :  7.84  (Mean VP of Antoine & Grain methods)

Water Solubility Estimate from Log Kow (WSKOW v1.42):
Water Solubility at 25 deg C (mg/L):  2024
log Kow used: 2.55 (estimated)
no-melting pt equation used

Water Sol Estimate from Fragments:
Wat Sol (v1.01 est) =  5244.8 mg/L

ECOSAR Class Program (ECOSAR v1.00):
Class(es) found:
Neutral Organics
```

```
Henrys Law Constant (25 deg C) [HENRYWIN v3.20]:
Bond Method :   8.63E-006  atm-m3/mole  (8.74E-001 Pa-m3/mole)
Group Method:   6.43E-006  atm-m3/mole  (6.52E-001 Pa-m3/mole)
For Henry LC Comparison Purposes:
User-Entered Henry LC:  not entered
Henrys LC [via VP/WSol estimate using User-Entered or Estimated values]:
HLC:  4.901E-006 atm-m3/mole  (4.966E-001 Pa-m3/mole)
VP:   0.0588 mm Hg (source: MPBPVP)
WS:   2.02E+003 mg/L (source: WSKOWWIN)

Log Octanol-Air Partition Coefficient (25 deg C) [KOAWIN v1.10]:
Log Kow used:  2.55  (KowWin est)
Log Kaw used:  -3.452  (HenryWin est)
Log Koa (KOAWIN v1.10 estimate):  6.002
Log Koa (experimental database):  None

Probability of Rapid Biodegradation (BIOWIN v4.10):
Biowin1 (Linear Model)         :   0.8452
Biowin2 (Non-Linear Model)     :   0.9094
Expert Survey Biodegradation Results:
Biowin3 (Ultimate Survey Model):   3.0758  (weeks       )
Biowin4 (Primary Survey Model) :   3.7922  (days        )
MITI Biodegradation Probability:
Biowin5 (MITI Linear Model)    :   0.6455
Biowin6 (MITI Non-Linear Model):   0.7240
Anaerobic Biodegradation Probability:
Biowin7 (Anaerobic Linear Model):  0.5141
Ready Biodegradability Prediction:   YES

Hydrocarbon Biodegradation (BioHCwin v1.01):
Structure incompatible with current estimation method!

Sorption to aerosols (25 Dec C)[AEROWIN v1.00]:
Vapor pressure (liquid/subcooled):  7.07 Pa (0.053 mm Hg)
Log Koa (Koawin est  ): 6.002
Kp (particle/gas partition coef. (m3/ug)):
Mackay model            :  4.25E-007
Octanol/air (Koa) model:  2.47E-007
Fraction sorbed to airborne particulates (phi):
Junge-Pankow model      :  1.53E-005
Mackay model            :  3.4E-005
Octanol/air (Koa) model:  1.97E-005

Atmospheric Oxidation (25 deg C) [AopWin v1.92]:
Hydroxyl Radicals Reaction:
OVERALL OH Rate Constant =  16.5255 E-12 cm3/molecule-sec
Half-Life =      0.647 Days (12-hr day; 1.5E6 OH/cm3)
Half-Life =      7.767 Hrs
Ozone Reaction:
No Ozone Reaction Estimation
Fraction sorbed to airborne particulates (phi):
2.46E-005 (Junge-Pankow, Mackay avg)
1.97E-005 (Koa method)
Note: the sorbed fraction may be resistant to atmospheric oxidation

Soil Adsorption Coefficient (KOCWIN v2.00):
Koc    :  34.42  L/kg (MCI method)
```

```
Log Koc:  1.537        (MCI method)
Koc    :  83.97  L/kg  (Kow method)
Log Koc:  1.924        (Kow method)

Aqueous Base/Acid-Catalyzed Hydrolysis (25 deg C) [HYDROWIN v2.00]:
Rate constants can NOT be estimated for this structure!

Bioaccumulation Estimates (BCFBAF v3.01):
Log BCF from regression-based method = 1.347 (BCF = 22.23 L/kg wet-wt)
Log Biotransformation Half-life (HL) = -0.4654 days (HL = 0.3424 days)
Log BCF Arnot-Gobas method (upper trophic) = 1.465 (BCF = 29.15)
Log BAF Arnot-Gobas method (upper trophic) = 1.465 (BAF = 29.15)
log Kow used: 2.55 (estimated)

Volatilization from Water:
Henry LC:  6.43E-006 atm-m3/mole  (estimated by Group SAR Method)
Half-Life from Model River:      104.3  hours   (4.344 days)
Half-Life from Model Lake :       1232  hours   (51.35 days)

Removal In Wastewater Treatment:
Total removal:                3.59  percent
Total biodegradation:         0.10  percent
Total sludge adsorption:      3.13  percent
Total to Air:                 0.36  percent
(using 10000 hr Bio P,A,S)

Removal In Wastewater Treatment:
Total removal:               93.11  percent
Total biodegradation:        92.00  percent
Total sludge adsorption:      1.05  percent
Total to Air:                 0.06  percent
(using Biowin/EPA draft method)

Level III Fugacity Model:
Mass Amount    Half-Life    Emissions
(percent)        (hr)        (kg/hr)
Air       1.59            15.5          1000
Water     32.5            360           1000
Soil      65.8            720           1000
Sediment  0.106           3.24e+003     0
Persistence Time: 408 hr
```

....

# Ex. 5 - Deliberative

# Ex. 5 - Deliberative

# Ex. 5 - Deliberative

# Ex. 5 - Deliberative

# Ex. 5 - Deliberative

Ex. 5 - Deliberative

# Ex. 5 - Deliberative

Ex. 5 - Deliberative

# FLUSHING UNDER SOURCE UNCERTAINTIES

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**Abstract**

*Upon determination of a possible contamination threat in a water distribution network, a variety of response actions (e.g., public notification and operational changes) can be pursued in order to minimize public health and economic impacts and ultimately return the utility to normal operations. Flushing is a relatively common operational response option employed by utilities to address water quality concerns. Previously, an optimal hydraulic response tool was developed to help identify the best hydrant locations to flush. However, in order to apply this tool the contaminant injection location needs to be known. In previous research efforts, either the injection location was assumed to be known, or a sensor coverage map, which displays all contamination incidents potentially detected by a sensor, was employed to identify all possible injection locations. While the flushing locations selected for a known source location were effective in reducing impacts, the locations selected based on sensor coverage maps were not as effective. Therefore, in this study, a source location algorithm based on an event backtracking analysis is used to identify the most likely source locations. An example network model and multiple injection locations are used to evaluate the effectiveness of this approach. In addition, the reduction in impacts between the three different source identification approaches (i.e., known, sensor coverage map, backtracking) were compared. Overall, knowing the contaminant injection location greatly influences the effectiveness of the flushing response. For this study, the smaller amount of possible source locations, the greater the reduction in impacts. If only one source location is identified, the impact reduction could be as high as 98%. However, when 18 possible sources were identified from the sensor coverage map approach, only a reduction of 2% was achieved.*

**Keywords**
Water distribution systems, contamination events, backtracking, event detection, flushing, response, water security

## 1. INTRODUCTION

Since the events of September 11, 2001, water utilities have had increasing concerns about water quality and the possibility of accidental or intentional contamination events within a distribution network. The U.S. EPA's Response Protocol Toolbox (U.S. EPA, 2003) provides recommendations on actions that water utilities can take to minimize potential impacts to consumers following a contamination threat. Detection, source identification, and consequence management are major steps in this protocol. Recent research efforts to aid in the first step, detection, have focused on the placement of online water quality monitoring sensors that together form a contamination warning system (CWS) (Kumar et al., 1997; Kessler et al., 1998; Ostfeld and Salomons, 2004; Berry et al., 2006; Propato, 2006; Murray et al., 2008; Ostfeld et al., 2008; Murray et al., 2010). The overall goal of a CWS is to detect contamination incidents in time to reduce potential public health and economic consequences. To address the second step of the protocol, researchers are developing source identification methods (Shang et al., 2002; van Bloemen Waanders et al., 2003; Laird et al., 2006; Preis and Ostfeld, 2006; De Sanctis et al., 2006; De Sanctis et al., 2008) to identify contaminant injection locations following successful detection of a contamination event.

Should a CWS detect the presence of a contaminant in a water distribution network, the third step in the protocol, consequence management, must be employed. A variety of response actions must be examined in order to select the most beneficial consequence management strategy, including public notifications and operational changes. A relatively common operational response option utilized by water utilities to address water quality concerns is flushing. Previous research efforts (Baranowski and LeBoeuf 2008) used hydraulic/water quality modeling and optimization tools to guide the selection of hydrant locations to flush and valves to close. The selection was based on minimizing the impact of a contamination incident in a water distribution system. In previous work, the contaminant injection location was assumed known prior to the implementation of a flushing strategy. However, during a real contamination incident, utility personnel might not have prior knowledge of the injection location. In this current research effort, the effect of knowing the injection location prior to response activities is evaluated. Combining all three steps of the protocol together, three different methods to identify the contamination source in the example network are utilized.

## 2. METHODOLOGY

The objective of this research is to identify hydraulic responses that reduce the impact of a contamination event on a water distribution network following successful detection and source identification. Using a single network model, EPANET, fixed sensors, and a genetic algorithm, two contamination incidents are simulated and three strategies for identifying the contaminant injection location are used to compare the performance of each flushing strategy.

Since in an actual contamination event the injection location of a contaminant which triggers an alarm at a sensor will most likely not be known accurately in real time, three methods to identify the source injection location were utilized: known, backtracking, and sensor coverage map. In the known approach, the contaminant injection location is known prior to the start of any response actions. This type of approach would be applicable if a criminal informed the water utility of the location or if clear evidence was found at the site. In general, this approach would lead to most effective consequence management strategy. In this paper, this approach is used as the baseline for the reduction in impact. The other two approaches, backtracking and sensor coverage map, are explained in more detail below. Once the contamination source location(s) have been identified, this information is supplied to an optimization routine which minimizes the impact(s) by selecting nodal locations to flush the contaminant out of the distribution network.

### 2.1 Backtracking

In the backtracking approach, simulated contaminant concentrations at the monitoring locations and the contamination status algorithm (CSA) proposed by De Sanctis et al. (2009; 2006) were used to determine possible contamination source locations. By using a particle backtracking algorithm (Shang et al., 2002), as implemented in the pre-release version of EPANET-BTX (a backtracking extension to EPANET), to establish network flow paths, the CSA identifies all the possible contamination sources in space and time. The CSA assigns a contamination source status to each node-time pair: candidate (possible contamination source), safe (not a possible contamination source), or unknown (insufficient information to classify the source). Using the candidate status as an indicator, the possible contamination sources were determined.

### 2.2 Sensor Coverage Map

For the sensor coverage map approach, the Threat Ensemble Vulnerability Assessment – Sensor Placement Optimization Tool (TEVA-SPOT) was used (U.S. EPA, 2009). Using fixed online sensor locations, contamination incidents at all of the nodes in the network were simulated and health impacts were calculated in TEVA-SPOT. A table in TEVA-SPOT lists the impacts, detection times, and detection sensor for all of the simulated incidents. With this information, the possible contamination sources to trigger an alarm at each sensor can be determined. This approach assumes that response actions are implemented immediately after the first alarm.

### 2.3 Optimization of Flushing Decisions

The optimization approach utilized has been modified from the method proposed by Baranowski and LeBoeuf (2008). The same genetic algorithm within MATLAB (MathWorks, 2008) was utilized to minimize the impacts of a contamination event by optimally selecting different flushing locations, however, the framework to simulate the incidents and calculate the impacts is different. Instead of using EPANET toolkit function calls, components of the TEVA-SPOT Toolkit (Berry et al., 2009) which simulate contamination incidents and assess consequences were employed. In order to be applicable for response applications, the TEVA-SPOT components had to be modified. The component which simulates contamination incidents was modified to alter demands at node locations identified as hydrants. The component which assesses consequences was modified to include a new impact metric which is used here as the optimization objective. The new metric is extent of contamination over a specified period of time. The extent of contamination in the network was calculated for all pipes and times until the end of the simulation. The extent of contamination is calculated as follows:

$$ExtentContamination = \sum_{\substack{i=1..N \\ j=t_{beg}..t_{end}}} contLength_{i,j}$$

where $i$ is the pipe number, $N$ is the total number of pipes, *contLength* is the length of contaminated pipe, and $j$ is time from the beginning of the simulation, $t_{beg}$, until the end of the simulation, $t_{end}$. The contaminated pipe length is determined as the entire length of pipe if the concentration in the pipe is greater than zero. This metric is used since it captures all of the time steps in which a pipe is contaminated and allows the pipe to become uncontaminated and re-contaminated in different time steps, assuming that the contaminant does not adsorb to the pipe wall. Other metrics of contamination effect could be utilized.

## 3. EXAMPLE

The example network utilized was Network 1 from the Battle of the Water Sensor Networks (BWSN) (Ostfeld et al., 2008), which consists of 126 nodes, one reservoir, two tanks, two pumps, eight valves, and 170 pipes (Figure 1). For this paper, sensors were located at Junctions 17, 21, 68, 79, and 122 (green stars in Figure 1) as determined by Berry et al. in the BWSN (Ostfeld et al., 2008). For purposes of simulation, a conservative contaminant with a mass injection rate of 8330 mg/min was injected at hour 168 of the simulation for one hour. The overall simulation time was 336 hours, which captured the majority of the contamination spread. The initial simulation ran until detection by one of the sensors, where detection was considered as a concentration greater than 0.01 mg/L.

Starting two hours after detection of the contaminant, flushing was initiated for eight hours. Two hours is an optimistic time period in which to confirm that contamination is occurring, estimate the possible source locations and spread of the plume, determine the best hydrants to flush, mobilize the necessary crews and have them travel to the sites. This response time delay was chosen since it leads to a conservative estimate on the reduction of impacts. For the purpose of this paper, a maximum of 10 flushing locations were chosen by the optimization algorithm. This number seemed reasonable based on information obtained from a partnering, middle-sized water utility, which stated that to avoid depressurization in their system, the maximum number of hydrants that can be flushed simultaneously is ten (Baranowski et al., 2008). The flushing discharge rate was set at 3.03 $m^3$/min (800 gpm).

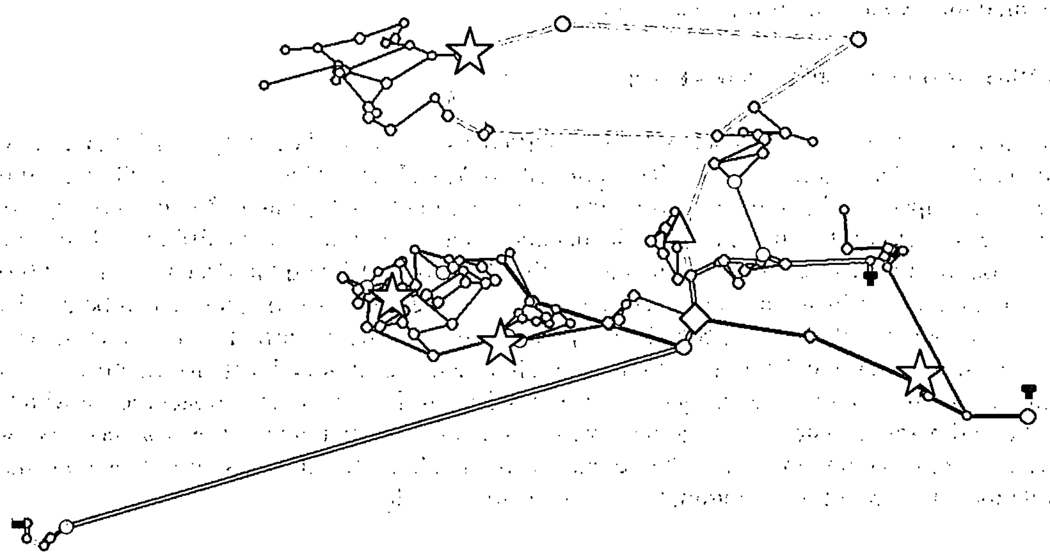

Figure 1. Schematic of BWSN Net 1. Colored links represent different diameter pipes, with thicker lines being larger diameters. Colored nodes represent different base demands, with larger nodes being larger demands. The green stars denote the sensor locations, the blue triangle is the injection location for Scenario 1, and the purple diamond is the injection location for Scenario 2.

## 4. RESULTS

The first injection scenario, Scenario 1, was initiated at Junction 21 (blue triangle in Figure 1), while the second injection scenario, Scenario 2, was initiated at Junction 23 (purple diamond in Figure 1). The scenarios were selected since they were detected relatively quickly (i.e., within two hours of the injection) by the fixed sensor locations. Scenario 1 was detected by the sensor at Junction 21 at hour 168 with a concentration of 2.96 mg/L. Scenario 2 was detected by Junction 68 at hour 170 with a concentration of 0.71 mg/L. For each injection scenario, the concentrations at each sensor and for each time step were determined. This concentration matrix was supplied to the contamination source algorithm. Using the flush start time for each scenario, the junctions that could have been sources at hour 168 in the simulation are identified for the backtracking source approach. For the sensor coverage map approach, TEVA-SPOT was used to identify all of the contamination events which could be detected by each of the sensors. Table 1 lists all of the possible source locations for the three source methods and the two scenarios.

Table 1. Source location junctions identified by three methods (known, backtracking, and sensor coverage) for two injection scenarios.

| Scenario | Known Source | Backtracking Source | Sensor Source |
|---|---|---|---|
| 1 | 21 | 20, 21 | 21, 22, 24, 25, 26, 27, 28, 43, 47, 48, 49, 50, 51, 52, Tank 130 |
| 2 | 23 | 23, 30, 33, 53, 55, 56, 63, 64, 67, 90, 91, 92 | 23, 30, 31, 53, 54, 55, 56, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68 |

The source locations listed in Table 1 were supplied as input to the optimal flushing method, which minimized the average impact across all of the injection locations. A total of six different optimal runs were completed. Each optimization analysis ran for 51 generations with a population of 50, for a total of 2600 simulations including the initial population simulation. The genetic algorithm selected the number of locations flushed and the locations to flush. The maximum number of locations that could be flushed was set at 10. All of the junctions in the model, or 126 locations, could be used as flushing locations. The flushing locations selected for the six optimizer runs are listed in Table 2. Each of the runs chose at least six locations to flush, with half of the runs selecting the upper limit of 10 locations.

Table 2. Flushing junctions selected for two scenarios and three source identification approaches.

| Scenario | Known Source | Backtracking Source | Sensor Source |
|---|---|---|---|
| 1 | 10, 11, 12, 13, 100, 111 | 14, 89, 93, 104, 125, 126, 128 | 5, 19, 30, 52, 54, 59, 71, 74, 82, 123 |
| 2 | 3, 7, 13, 23, 31, 47, 52, 63, 81, 91 | 33, 35, 48, 49, 63, 71, 79, 81, 99, 114 | 16, 57, 65, 81, 82, 83, 86 |

Table 3 lists the percent reduction in the impact measure from the base case of no flushing. For scenario 1, the known source approach achieved the greatest reduction in impact of 98%; with the backtracking approach having a similar percent reduction of 84%. Using the sources identified in the backtracking approach had better results than the sensor coverage map approach. The sensor coverage map approach had the lowest reduction in impact with 21% reduction. Since scenario 1 was detected early, a greater reduction in the impact was achievable. Scenario 2 was detected later; therefore, the impact was only reduced by 47% for the known source approach. The backtracking source and the sensor coverage map approaches were only able to reduce the impacts by about 2%.

Table 3. The percent reduction in the extent of contamination for the two scenarios and three source identification approaches.

| Scenario | Known Source | Backtracking Source | Sensor Source |
|---|---|---|---|
| 1 | 98.5 | 83.7 | 20.9 |
| 2 | 47.4 | 2.4 | 1.8 |

While the flushing locations selected for the backtracking and sensor coverage map approaches reduced the impacts by the percentages shown in Table 3, these locations might be able to reduce the impacts associated with the other identified source locations by a greater percentage. For the backtracking approach, the identified source locations and their associated impact reductions for each scenario are listed in Table 4. The average impact reduction was 90% and 76% for scenarios 1 and 2, respectively. For scenario 1, the average impact was reduced by 90%, while the true source location was reduced by 84%. Eight of the identified source locations for scenario 2 were reduced by at least 80%. Unfortunately, the true source location was only reduced by less than 2%.

Table 4. For the backtracking approach, the reduction percentage for each of the identified source locations.

| Scenario 1 | |
|---|---|
| Source Location | Percent Reduction |
| JUNCTION-20 | 95.91 |
| JUNCTION-21 | 83.71 |
| | |
| Average | 89.81 |

| Scenario 2 | |
|---|---|
| Source Location | Percent Reduction |
| JUNCTION-23 | 2.39 |
| JUNCTION-30 | 94.36 |
| JUNCTION-33 | 52.65 |
| JUNCTION-53 | 80.37 |
| JUNCTION-55 | 85.76 |
| JUNCTION-56 | 87.75 |
| JUNCTION-63 | 97.88 |
| JUNCTION-64 | 97.47 |
| JUNCTION-67 | 98.23 |
| JUNCTION-90 | 75.22 |
| JUNCTION-91 | 92.25 |
| JUNCTION-92 | 42.58 |
| | |
| Average | 75.58 |

For the sensor coverage map approach, the optimization routine reduced the average impact by at least 50%. Table 5 lists the source locations identified by this approach and their associated reduction in impact for each scenario. For scenario 1, five of the identified source locations were reduced by at least 98%, however the true source location was only reduced by 21%. Sixteen of the identified source locations were reduced by at least 96%, while the true source location was reduced by less than 2% for scenario 2.

Table 5. For the sensor coverage map approach, the reduction percentage for each of the identified source locations.

| Scenario 1 | |
|---|---|
| **Source Location** | **Percent Reduction** |
| JUNCTION-21 | 20.87 |
| JUNCTION-22 | 3.19 |
| JUNCTION-24 | 78.47 |
| JUNCTION-25 | 79.14 |
| JUNCTION-26 | 2.26 |
| JUNCTION-27 | 3.72 |
| JUNCTION-28 | 2.18 |
| JUNCTION-43 | 59.65 |
| JUNCTION-47 | 79.74 |
| JUNCTION-48 | 99.68 |
| JUNCTION-49 | 98.62 |
| JUNCTION-50 | 99.98 |
| JUNCTION-51 | 98.32 |
| JUNCTION-52 | 97.99 |
| TANK-130 | 1.46 |
| | |
| Average | 51.91 |

| Scenario 2 | |
|---|---|
| **Source Location** | **Percent Reduction** |
| JUNCTION-23 | 1.78 |
| JUNCTION-30 | 99.15 |
| JUNCTION-31 | 96.66 |
| JUNCTION-53 | 97.49 |
| JUNCTION-54 | 97.19 |
| JUNCTION-55 | 96.83 |
| JUNCTION-56 | 97.85 |
| JUNCTION-58 | 56.43 |
| JUNCTION-59 | 99.27 |
| JUNCTION-60 | 99.30 |
| JUNCTION-61 | 98.75 |
| JUNCTION-62 | 98.96 |
| JUNCTION-63 | 97.68 |
| JUNCTION-64 | 96.89 |
| JUNCTION-65 | 97.36 |
| JUNCTION-66 | 96.23 |
| JUNCTION-67 | 98.01 |
| JUNCTION-68 | 97.63 |
| | |
| Average | 70.97 |

## 5. CONCLUSIONS

Following successful detection by a CWS, actions to reduce the impact of a contamination event must be implemented. One response action which can be implemented relatively quickly is flushing. To increase the effectiveness of the flushing strategy, the most beneficial hydrants should be selected. Knowing the contaminant injection location and network hydraulics prior to the start of any flushing strategy could assist the water utility in selecting better hydrant locations to remove the contaminated water from the network. For this research effort, an optimization tool linked with a hydraulic/water quality model was utilized to select the hydrant locations. The optimization tool was supplied with contaminant injection locations identified by three different approaches: a known source, sources determined by a backtracking tool, and sources determined by a sensor coverage map.

The three source location approaches resulted in different reductions of the impact. Knowing the source location resulted in the greatest reduction in the impact measure, while the flushing locations selected from the sensor coverage map approach decreased impacts by less than 20%. Overall, knowing the contaminant injection location greatly influences the effectiveness of the flushing response (Tables 3, 4, and 5). For this example network, when online water quality sensor measurements from a CWS are linked with a backtracking tool and optimal hydraulic response tool, the greatest reduction in the impact of contamination event were achieved. To explore the applicability of this approach to real world systems, larger water distribution networks, such as the BWSN Network 2 and real world utility networks, will be used in future studies. In addition, a variety of injection locations and impact measures will be explored. Instead of minimizing the average impact over all possible sources, another objective function could maximize the minimum performance over all possible sources.

## Disclaimer

This project has been subjected to the U.S. Environmental Protection Agency's review and has been approved for publication. The scientific views expressed are solely those of the authors and do not necessarily reflect those of the U.S. EPA. Mention of trade names or commercial products does not constitute endorsement or recommendation for use.

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# Evaluating Response Planning Initiatives: Modeling Assumptions

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## Abstract

The potential for intentional contamination of the nation's drinking water infrastructure has heightened utility awareness regarding distribution system security. Corrective actions implemented by a water utility following a contamination incident have the potential to significantly mitigate public health and infrastructure impacts. Many mitigation and response options are available (e.g., flushing at hydrants to remove contaminants from pipes, injecting disinfectant or decontamination agents at booster stations to treat the water or remove the contaminant from pipe walls, sampling at locations throughout the network to determine the extent of contamination, or instituting "Do Not Drink" or "Do Not Use" public advisories). For any given utility, some options might be more effective than others, and the effectiveness might depend on timing and other factors. Modeling and simulation studies can help utility decision-makers evaluate the effectiveness and feasibility of various response actions. However, utilities need to use realistic input parameters to ensure that modeling results are meaningful.

This paper summarizes the input parameters needed to realistically model utility response options as well as lessons learned from discussions with two water utilities on the practicality of initiating specific response actions. The purpose of the utility discussions was to ground-truth modeling assumptions and eliminate impractical and inefficient response options, while also placing realistic bounds on input parameters. With more accurate information, the results from simulation and optimization models will be more acceptable to water utilities and policy makers. Generating plausible approaches to dealing with a contamination incident will support the utilities' decision making process and facilitate selection of the most effective operational response. The value of this type of response planning is discussed for a wide audience of water utilities.

## Introduction

As one of the nation's critical infrastructures, drinking water distribution systems are susceptible to contaminant intrusion, whether accidental or intentional. The prospect of contamination of the nation's drinking water infrastructure has heightened awareness regarding protection of drinking water distribution systems, and also increased research on minimizing and mitigating threats. Contaminants in the distribution system can be detected by a Contamination Warning System (CWS) that includes optimally placed water quality sensors, rapid communication, data analysis, and confirmatory sampling (Janke et al. 2006; Murray et al. 2008). Decreases in public health and infrastructure damages, as well as an increase in utility rapid response potential can be attributed to the implementation of a CWS. Recent analysis of nine large water utilities has estimated that a significant reduction in public health impacts (48%) with an associated economic impact savings of over $19 billion can be achieved with application of a CWS (Murray et al. 2009).

The online monitoring component of a CWS is comprised of sensors that evaluate continuous water quality. Event detection systems (EDSs), such as the open source CANARY program (Hart et al. 2009), can be utilized to distinguish outliers in water quality data, which vary from typically observed values by more than a designated threshold. Free chlorine sensors are one of the most critical components of a CWS because inconsistencies from baseline measurements or an abrupt decrease in residual concentration might be indicative of some form of contaminant intrusion (Hall et al. 2007).

In the event that an anomalous water quality incident is detected in the distribution system, utility response actions would likely follow a consequence management plan where the presence of contamination would be confirmed, crews would be mobilized to respond, and mitigation actions would be enacted. The explicit mitigation strategy employed would be utility-specific and dependent on an existing knowledge of the distribution systems hydraulics and demand patterns.

An assortment of response strategies (e.g., flushing, valve closures, storage tank isolation, and booster disinfection) are examined in this paper, as consequence management involves application of more than one mitigation technique. A properly designed flushing action can dislodge and transport contaminants out of the distribution system. Valve isolation, which can be used to segregate contaminated pipe(s) from the rest of the distribution system, can contain and control the spread of a contaminant. Storage tank isolation can be used to prevent contaminated water from entering the tank inflow, or it can be used to confine the contaminant within the tank and retain it until suitable decontamination measures can be taken. Employing booster disinfection can treat specific portions of the distribution network in order to mitigate the effects of contaminant agents, and also presents a potential means for introducing alternative decontaminant agents (e.g., surfactants or pH-modification agents) into the distribution system. Public advisories, such as instituting "Do Not Drink" notifications, are a critical response to a contamination and are explored further in this work.

Modeling and simulation studies are invaluable tools in response planning. Many details pertaining to treatment and decontamination, specifically about when, where, how, and for how long can be studied ahead of time using modeling and simulation. Examining various response scenarios through modeling can provide an effective proving ground for utilities without having to experience, for example, that implementing flushing in a given scenario causes the contamination to spread further in the network.

In order to address the objective of this work, information on realistic modeling input parameters for specific response actions was obtained through collaboration with two large drinking water utilities. The data obtained from the utilities aided in placing more precise bounds on response options by identifying the most realistic response parameters achievable (e.g., flushing rates, or the total number of booster stations that can be placed in a network). This effort is part of a larger work to establish a viable water security response planning tool for utilities.

## Flushing

Flushing is a common method utilities use to address water quality concerns. It is a response option that can be undertaken relatively quickly after an event, and be made even more efficient through careful selection of the most advantageous flushing locations, rates, and durations.

Utilities make use of two common flushing routines, conventional and unidirectional, to manage water quality issues within the distribution system. Conventional flushing, practiced by the majority of utilities, involves opening one or more hydrants in an area of the distribution system experiencing water quality concerns until water quality standards (e.g., restoration of an acceptable disinfectant residual, reduction in unpleasant taste or odor) are met (AwwaRF 2003b). With conventional flushing, velocities may not be maximized, given that hydrants may not be opened in sequential manner. In comparison, the unidirectional flushing technique incorporates valve closures and opens hydrants in a sequential manner, so that water is only flushed in one direction, maximizing velocity and cleaning efficiency.

Modeling and simulation of flushing allows for an examination of the utility-controlled options, such as where to flush, for how long, and at what rate. An optimization tool linked with a hydraulic/water quality model can be utilized to select the most beneficial hydrant flushing locations (Haxton and Uber 2010). Baranowski et al. (2008) examined the effects of simulated flushing, valve closures, and a combination of both to reduce contamination spread in an example distribution network. Each operational response was evaluated with regard to its mitigation capability, in order to determine the practicality of implementing various operational responses that a utility could use in the event of a real-time contamination.

Although modeling and simulation of response options can provide information on the benefits of various mitigation scenarios, the accuracy of the modeling results can be improved if real-world constraints are placed on input parameters. This may not be possible without the development of a comprehensive database that utilities can turn to when they need guidance for response protocol. Given that no such database of response protocols currently exists, many operational variables are approximated (AwwaRF 2003b). Moreover, this type of information may be difficult to come by since it is likely utility-specific. Baranowski et al. (2008a) obtained information on flushing and valve closure parameters from Ann Arbor's water treatment plant personnel. Input parameters obtained in this study included minimum and maximum values associated with:

- The practiced flushing rate in gallons per minute (gpm)
- The flushing duration (hours or minutes)
- The maximum number of hydrants that can be flushed simultaneously without causing depressurization
- The response time for flushing crews from time of detection to initiation of flushing

**Booster Disinfection**

Injecting disinfectant directly into the distribution system through a booster station is another viable consequence management option for utilities. Booster disinfection is a technique utilized within a drinking water distribution system in which a disinfectant is applied at predetermined locations throughout the network. This can be done at a booster pump station, valve vault, or pressure reducing station, provided there is electricity available to run the small injector pump for the injection (Satterfield 2006). Employing disinfectant booster stations within a drinking water distribution system in conjunction with conventional treatment plant practices can meet residual requirements at all points of consumption without releasing disproportionate concentrations of disinfectant at the point of entry into the system (AwwaRF 2003a). Additionally, modeling and simulation of booster disinfection has shown the potential for a reduction in the total mass of disinfectant added to the system by carefully selecting the booster locations (Boccelli et al. 1998; Tryby et al. 2002; AwwaRF 2003a; Propato and Uber 2004). More recent modeling efforts have focused on applying booster disinfection in the context of response to a contamination incident (Haxton et al. 2011).

Under normal operations, booster chlorination addresses the issue of maintaining an adequate disinfectant residual throughout a distribution system, which is a requirement enforced under the Surface Water Treatment Rule (SWTR). Under the SWTR, finished water leaving the water treatment plant cannot drop below the 0.2 mg/L disinfectant residual benchmark for more than a four hour period without falling out of compliance (US EPA 1990). Sustaining a detectable residual throughout the distribution system is another requirement under SWTR. However, this mandate creates a major challenge for utilities, who must balance meeting the treatment objective of providing an adequate disinfectant residual with minimizing potential public health risks from elevated concentrations of disinfectant and associated by-products. Booster chlorination can resolve these concerns through the reapplication of disinfectant at strategic points in the distribution system. It can also be employed for consequence managment in addition to conventional use. Following a contamination event, chlorination via multiple booster stations can be used to treat the contaminant in the pipes.

In a typical booster station, the concentration of chlorine is measured both at the inlet and outlet of the booster station. As the chlorine residual enters the booster station, the analyzer at the inlet reads the measurement and controls the chlorine injection rate to attain the desired residual value downstream of the booster station. Injection dosages of the booster disinfectant are applied manually, by a human operator, or are automated and controlled remotely via a Supervisory Control and Data Acquisition (SCADA) system. In the case of automated control, the chemical feed pumps are monitored remotely at the water treatment plant. The feed pumps can also be equipped with an alarm, which detects a malfunction in the pump operation, such as a loss of chemical feed (Potts 2001).

The chemical feed rate for the disinfectant injection can be either flow-paced, meaning it is adjusted based on measurements of control variables such as the flow rate, or it can be constant. In order to maintain a system-wide chlorine residual of 1.0 mg/L, typical feed rates vary between 1.0-2.0 mg/L (US EPA 1999; AMWA 2007). An AWWA survey (2003a) of water utilities operating booster stations shows that most (55 %) used a constant delivery dose, while 35 % used flow-pacing or residual pacing to adjust the dose. A few stations used a time-dependent set-point control. The water flow not only affects the quantity of the chlorine dose, but also the type of dosing equipment that is most suitable (Potts 2001).

A key consideration for implementing booster disinfection is the proper placement of booster facilities in the distribution system. Kirmeyer et al. (2000) distinguished the following criteria in selecting the most beneficial location of booster stations: the water to be treated travels in one direction, the residual concentration exhibits a decrease but is not completely absent, and a relativley large volume of water can be disinfected by the booster station. According to Kirkmeyer, these conditions can be met when the booster station is positioned in an existing pump station or at the outlet of a storage facility where metering equipment is already located.

The type of disinfectant used at a booster facility can be a critical safety issue for utilities. Although a 2008 AwwaRF suvey indicated that the majority of responding utilities (63%) disinfected with chlorine gas (AwwaRF 2008), similar to the 2003 AwwaRF survey, a number of utilities are converting from chlorine gas to sodium hypochlorite as a preferred method of disinfection (AMWA 2007). For example, the Northern Kentucky Water District previously operated four chlorine booster disinfection stations in order to maintain a system chlorine residual of 1.0 mg/L. Of the four booster stations, two are located in residential areas. Following an accidental release from one of the residential booster stations, the utility made the decision to convert from the use of chlorine gas to liquid sodium hypochlorite for safety purposes (AMWA 2007).

Optimization of the quantity, locations, and general operation of disinfectant booster stations can be achieved through modeling and simulation. When modeling booster disinfection as a contamination response option, particular input parameters are required. These input parameters include design details, such as the total number of booster stations that can be placed within a distribution system without restrictions. Operational information is also required for modeling inputs. Data on the choice of disinfectants utilized at booster stations as well as specifics on feed control processes are critical for modeling and simulation studies.

## Additional Response Strategies

As part of the larger water security tool to evaluate mitigation strategies for utilities, research on additional response approaches has been and will be conducted. Research includes the study of source inversion methods (Shang et al. 2001; Laird et al. 2006) to identify the location where a contaminant was introduced into the network using real-time sensor signals as input. Additional research includes studies to identify optimal confirmatory distribution system sampling locations to categorize where and when elevated levels of a contaminant are detected in the water; determine valve and storage tank isolation strategies to prevent contamination from entering a tank or high customer demand node (Baranowski et al. 2008a; Baranowski and Leboeuf 2008b; Hagar et al. 2011); develop risk maps to identify regions in which people might have been exposed to elevated contaminant concentrations; and develop real-time hydraulic and water quality modeling packages to more accurately reflect water distribution dynamics (Hatchett et al. 2011). When all of the potential response approaches are combined, they will provide practical consequence management assistance for utilities.

## Approach

A background literature review on flushing and booster disinfection was completed in order to obtain information regarding realistic response strategies. A number of questions concerning the response strategies remained following the literature review. These remaining questions underscored the need for collaboration with drinking water utilities in order to gain insight on realistic operational parameters for use in modeling and simulation of the response options. For this study, two drinking water utilities were selected to provide utility-specific response information.

The following questions illustrate what was asked of the utilities to facilitate booster station modeling:

- How many booster stations are present in the distribution system?
- How often are they run/operated? Continuously? On a set schedule? Seasonally?
- How is the chlorine dosage controlled at the stations? Flow paced? Constant mass rate? Based on chlorine residual measurements? What is the average chlorine dosage?
- How are they operated? Automatically via SCADA? Manually? How long does it take to turn on/off a booster station?
- How were the locations of the stations determined? Do they need to be located near certain pieces of equipment? Near a tank or pump?

Baranowski et al. (2008a) previously collaborated with the City of Ann Arbor on the subject of flushing and valve closure as a response to a contamination incident. The subsequent list of questions was asked of the utility in regard to their flushing practices. Identical questions were asked of the two utilities involved in this current work for purposes of evaluation.

- What is the total number of hydrants present within the distribution system?
- Are hydrants exercised, if so how often?
- What are the achievable flows out of a hydrant?
- What is the total number of in-line valves?
- Where are isolation valves located?
- Do all pipes have isolation valves?
- Is a flushing program practiced? What type (conventional or unidirectional)?
- Is continuous service provided to customers during flushing?
- If unidirectional flushing is practiced, how are hydrants and valves determined and used?
- What is the practiced flushing rate (gpm)?
- How long is this rate maintained (hours or minutes)?
- What is the size range of pipes flushed ( ___ to ___ inches)?

**Results and Discussion**

Results of discussions with utilities regarding practical limitations on booster disinfection, flushing, and valve isolation will be discussed at the EWRI congress in May 2012.

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# Ex. 5 - Deliberative

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ALS Environmental

06-Feb-2014

Scott Smith
Water Defense
PO Box 304
Hurleyvulle, NY 12747

Tel: (518) 568-7036
Fax: (518) 568-2614

Re: MCHM Analysis

Work Order: **1401502**

Dear Scott,

ALS Environmental received 3 samples on 23-Jan-2014 01:05 PM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested.

QC sample results for this data met laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Laboratory Group. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 10.

If you have any questions regarding this report, please feel free to contact me.

Sincerely,

Rob Nieman

Electronically approved by: Shawn Smythe

Rob Nieman
Project Manager

**ALS Environmental** Date: 06-Feb-14

**Client:** Water Defense
**Project:** MCHM Analysis
**Work Order:** 1401502

## Work Order Sample Summary

Ex. 5 - Deliberative

| Lab Samp ID | Client Sample ID | Matrix | Tag Number | Collection Date | Date Received | Hold |
|---|---|---|---|---|---|---|
| 1401502-01 | WEST VIRGINIA - BATHTUB #1 | Bulk | | 1/12/2014 12:00 | 1/23/2014 13:05 | ☐ |
| 1401502-02 | WEST VIRGINIA - BATHTUB #2 | Bulk | | 1/12/2014 17:30 | 1/23/2014 13:05 | ☐ |
| 1401502-03 | ELK RIVER - RIVER IND. | Bulk | | 1/12/2014 13:30 | 1/23/2014 13:05 | ☐ |

Ex. 5 - Deliberative

| | |
|---|---|
| **Client:** | Water Defense |
| **Project:** | MCHM Analysis |
| **Work Order:** | 1401502 |

# Case Narrative

The analytical data provided relates directly to the samples received by ALS Laboratory Group and for only the analyses requested.

QC sample results for this data met laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Laboratory Group. Samples will be disposed in 30 days unless storage arrangements are made.

# ALS Environmental

**Date:** *06-Feb-14*

**Client:** Water Defense
**Project:** MCHM Analysis
**Work Order:** 1401502
**Sample ID:** ELK RIVER - RIVER IND.
**Lab ID:** 1401502-03
**Collection Date:** 1/12/2014 01:30 PM
**Matrix:** BULK

| Analyses | Result | Qual | Report Limit | Units | Dilution Factor | Date Analyzed |
|---|---|---|---|---|---|---|
| **MERCURY BY CVAA** | | | **SW7471A** | | Prep Date: **2/4/2014** | Analyst: **KMW** |
| Mercury | ND | | 0.056 | mg/Kg | 1 | 2/5/2014 04:22 PM |
| **METALS BY ICP** | | | **SW6010B** | | Prep Date: **2/4/2014** | Analyst: **VAW** |
| **Aluminum** | **120** | | **78** | **mg/Kg** | 1 | 2/5/2014 08:24 AM |
| Arsenic | ND | | 0.78 | mg/Kg | 1 | 2/5/2014 08:24 AM |
| **Barium** | **3.3** | | **1.6** | **mg/Kg** | 1 | 2/5/2014 08:24 AM |
| Beryllium | ND | | 0.078 | mg/Kg | 1 | 2/5/2014 08:24 AM |
| Cadmium | ND | | 0.16 | mg/Kg | 1 | 2/5/2014 08:24 AM |
| **Calcium** | **3,800** | | **78** | **mg/Kg** | 1 | 2/5/2014 08:24 AM |
| **Chromium** | **0.52** | | **0.31** | **mg/Kg** | 1 | 2/5/2014 08:24 AM |
| Cobalt | ND | | 0.78 | mg/Kg | 1 | 2/5/2014 08:24 AM |
| Copper | ND | | 0.78 | mg/Kg | 1 | 2/5/2014 08:24 AM |
| **Iron** | **430** | | **16** | **mg/Kg** | 1 | 2/5/2014 08:24 AM |
| Lead | ND | | 0.78 | mg/Kg | 1 | 2/5/2014 08:24 AM |
| Lithium | ND | | 1.6 | mg/Kg | 1 | 2/5/2014 08:24 AM |
| **Magnesium** | **340** | | **16** | **mg/Kg** | 1 | 2/5/2014 08:24 AM |
| **Manganese** | **24** | | **0.78** | **mg/Kg** | 1 | 2/5/2014 08:24 AM |
| Molybdenum | ND | | 1.6 | mg/Kg | 1 | 2/5/2014 08:24 AM |
| **Nickel** | **0.79** | | **0.78** | **mg/Kg** | 1 | 2/5/2014 08:24 AM |
| **Phosphorus** | **9.7** | | **1.6** | **mg/Kg** | 1 | 2/5/2014 08:24 AM |
| Platinum | ND | | 16 | mg/Kg | 1 | 2/5/2014 08:24 AM |
| Selenium | ND | | 0.47 | mg/Kg | 1 | 2/5/2014 08:24 AM |
| Silver | ND | | 0.16 | mg/Kg | 1 | 2/5/2014 08:24 AM |
| Sodium | ND | | 78 | mg/Kg | 1 | 2/5/2014 08:24 AM |
| Tellurium | ND | | 1.6 | mg/Kg | 1 | 2/5/2014 08:24 AM |
| Thallium | ND | | 0.47 | mg/Kg | 1 | 2/5/2014 08:24 AM |
| **Tin** | **1.6** | J | **1.6** | **mg/Kg** | 1 | 2/5/2014 08:24 AM |
| **Titanium** | **1.7** | | **1.6** | **mg/Kg** | 1 | 2/5/2014 08:24 AM |
| Tungsten | ND | | 16 | mg/Kg | 1 | 2/5/2014 08:24 AM |
| Vanadium | ND | | 0.78 | mg/Kg | 1 | 2/5/2014 08:24 AM |
| Yttrium | ND | | 1.6 | mg/Kg | 1 | 2/5/2014 08:24 AM |
| **Zinc** | **39** | | **0.78** | **mg/Kg** | 1 | 2/5/2014 08:24 AM |
| Zirconium | ND | | 1.6 | mg/Kg | 1 | 2/5/2014 08:24 AM |

**Note:**

ALS Environmental

Date: 06-Feb-14

**Client:** Water Defense

**Work Order:** 1401502

**Project:** MCHM Analysis

# QC BATCH REPORT

Batch ID: **20744** Instrument ID **HG1** Method: **SW7471A**

**MBLK** Sample ID **MBLK-20744-20744** Units: **mg/Kg** Analysis Date: **2/5/2014 04:18 PM**

Client ID: Run ID: **HG1_140205B** SeqNo: **758066** Prep Date: **2/4/2014** DF: **1**

| Analyte | Result | PQL | SPK Val | SPK Ref Value | %REC | Control Limit | RPD Ref Value | %RPD | RPD Limit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| Mercury | ND | 0.30 | | | | | | | | |

**LCS** Sample ID **LCS-20744-20744** Units: **mg/Kg** Analysis Date: **2/5/2014 04:14 PM**

Client ID: Run ID: **HG1_140205B** SeqNo: **758064** Prep Date: **2/4/2014** DF: **1**

| Analyte | Result | PQL | SPK Val | SPK Ref Value | %REC | Control Limit | RPD Ref Value | %RPD | RPD Limit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| Mercury | 0.7617 | 0.30 | 0.8334 | 0 | 91.4 | 69-147 | 0 | | | |

**LCSD** Sample ID **LCSD-20744-20744** Units: **mg/Kg** Analysis Date: **2/5/2014 04:16 PM**

Client ID: Run ID: **HG1_140205B** SeqNo: **758065** Prep Date: **2/4/2014** DF: **1**

| Analyte | Result | PQL | SPK Val | SPK Ref Value | %REC | Control Limit | RPD Ref Value | %RPD | RPD Limit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| Mercury | 0.7617 | 0.30 | 0.8334 | 0 | 91.4 | 69-147 | 0.7617 | 0 | 20 | |

**The following samples were analyzed in this batch:** 1401502-03A

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Water Defense
**Work Order:** 1401502
**Project:** MCHM Analysis

# QC BATCH REPORT

Batch ID: **20745** Instrument ID **ICP3** Method: **SW6010B**

**MBLK** Sample ID **mblk-20745-20745** Units: **mg/Kg** Analysis Date: **2/5/2014 07:57 AM**

Client ID: Run ID: **ICP3_140205A** SeqNo: **757673** Prep Date: **2/4/2014** DF: **1**

| Analyte | Result | PQL | SPK Val | SPK Ref Value | %REC | Control Limit | RPD Ref Value | %RPD | RPD Limit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum | ND | 500 | | | | | | | | |
| Arsenic | ND | 5.0 | | | | | | | | |
| Barium | ND | 10 | | | | | | | | |
| Beryllium | ND | 0.50 | | | | | | | | |
| Cadmium | ND | 1.0 | | | | | | | | |
| Calcium | ND | 500 | | | | | | | | |
| Chromium | ND | 2.0 | | | | | | | | |
| Cobalt | ND | 5.0 | | | | | | | | |
| Copper | ND | 5.0 | | | | | | | | |
| Iron | ND | 100 | | | | | | | | |
| Lead | ND | 5.0 | | | | | | | | |
| Lithium | ND | 10 | | | | | | | | |
| Magnesium | ND | 100 | | | | | | | | |
| Manganese | ND | 5.0 | | | | | | | | |
| Molybdenum | ND | 10 | | | | | | | | |
| Nickel | ND | 5.0 | | | | | | | | |
| Phosphorus | ND | 10 | | | | | | | | |
| Platinum | ND | 100 | | | | | | | | |
| Selenium | ND | 3.0 | | | | | | | | |
| Silver | ND | 1.0 | | | | | | | | |
| Sodium | ND | 500 | | | | | | | | |
| Tellurium | ND | 10 | | | | | | | | |
| Thallium | ND | 3.0 | | | | | | | | |
| Tin | ND | 10 | | | | | | | | |
| Titanium | ND | 10 | | | | | | | | |
| Tungsten | ND | 100 | | | | | | | | |
| Vanadium | ND | 5.0 | | | | | | | | |
| Yttrium | ND | 10 | | | | | | | | |
| Zinc | ND | 5.0 | | | | | | | | |
| Zirconium | ND | 10 | | | | | | | | |

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Water Defense
**Work Order:** 1401502
**Project:** MCHM Analysis

# QC BATCH REPORT

Batch ID: **20745** Instrument ID **ICP3** Method: **SW6010B**

**LCS** Sample ID **lcs-20745-20745** Units: **mg/Kg** Analysis Date: **2/5/2014 08:04 AM**
Client ID: Run ID: **ICP3_140205A** SeqNo: **757674** Prep Date: **2/4/2014** DF: **1**

| Analyte | Result | PQL | SPK Val | SPK Ref Value | %REC | Control Limit | RPD Ref Value | %RPD | RPD Limit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum | ND | 500 | 200 | 0 | 91.8 | 80-120 | 0 | | | |
| Arsenic | 198.4 | 5.0 | 200 | 0 | 99.2 | 80-120 | 0 | | | |
| Barium | 204 | 10 | 200 | 0 | 102 | 80-120 | 0 | | | |
| Beryllium | 185.1 | 0.50 | 200 | 0 | 92.6 | 80-120 | 0 | | | |
| Cadmium | 205.6 | 1.0 | 200 | 0 | 103 | 80-120 | 0 | | | |
| Calcium | ND | 500 | 200 | 0 | 91.3 | 80-120 | 0 | | | |
| Chromium | 202.4 | 2.0 | 200 | 0 | 101 | 80-120 | 0 | | | |
| Cobalt | 190.1 | 5.0 | 200 | 0 | 95 | 80-120 | 0 | | | |
| Copper | 188.8 | 5.0 | 200 | 0 | 94.4 | 80-120 | 0 | | | |
| Iron | 183 | 100 | 200 | 0 | 91.5 | 80-120 | 0 | | | |
| Lead | 208 | 5.0 | 200 | 0 | 104 | 80-120 | 0 | | | |
| Magnesium | 193.1 | 100 | 200 | 0 | 96.6 | 80-120 | 0 | | | |
| Manganese | 184.6 | 5.0 | 200 | 0 | 92.3 | 80-120 | 0 | | | |
| Molybdenum | 191.6 | 10 | 200 | 0 | 95.8 | 80-120 | 0 | | | |
| Nickel | 191.9 | 5.0 | 200 | 0 | 96 | 80-120 | 0 | | | |
| Selenium | 197.1 | 3.0 | 200 | 0 | 98.5 | 80-120 | 0 | | | |
| Silver | 191.9 | 1.0 | 200 | 0 | 96 | 80-120 | 0 | | | |
| Sodium | ND | 500 | 200 | 0 | 93 | 80-120 | 0 | | | |
| Thallium | 192 | 3.0 | 200 | 0 | 96 | 80-120 | 0 | | | |
| Titanium | 184 | 10 | 200 | 0 | 92 | 80-120 | 0 | | | |
| Vanadium | 187.3 | 5.0 | 200 | 0 | 93.6 | 80-120 | 0 | | | |
| Zinc | 195.3 | 5.0 | 200 | 0 | 97.6 | 80-120 | 0 | | | |

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Water Defense
**Work Order:** 1401502
**Project:** MCHM Analysis

# QC BATCH REPORT

Batch ID: **20745** Instrument ID **ICP3** Method: **SW6010B**

**LCSD** Sample ID **lcsd-20745-20745** Units: **mg/Kg** Analysis Date: **2/5/2014 08:10 AM**
Client ID: Run ID: **ICP3_140205A** SeqNo: **757675** Prep Date: **2/4/2014** DF: **1**

| Analyte | Result | PQL | SPK Val | SPK Ref Value | %REC | Control Limit | RPD Ref Value | %RPD | RPD Limit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum | ND | 500 | 200 | 0 | 92.6 | 80-120 | 183.6 | 0 | | |
| Arsenic | 198.9 | 5.0 | 200 | 0 | 99.4 | 80-120 | 198.4 | 0.252 | | |
| Barium | 203.2 | 10 | 200 | 0 | 102 | 80-120 | 204 | 0.393 | | |
| Beryllium | 184.4 | 0.50 | 200 | 0 | 92.2 | 80-120 | 185.1 | 0.39 | | |
| Cadmium | 205.6 | 1.0 | 200 | 0 | 103 | 80-120 | 205.6 | 0 | | |
| Calcium | ND | 500 | 200 | 0 | 91.9 | 80-120 | 182.6 | 0 | | |
| Chromium | 202.2 | 2.0 | 200 | 0 | 101 | 80-120 | 202.4 | 0.0989 | | |
| Cobalt | 189.5 | 5.0 | 200 | 0 | 94.8 | 80-120 | 190.1 | 0.306 | | |
| Copper | 188.1 | 5.0 | 200 | 0 | 94.1 | 80-120 | 188.8 | 0.371 | | |
| Iron | 182.3 | 100 | 200 | 0 | 91.2 | 80-120 | 183 | 0.372 | | |
| Lead | 207.2 | 5.0 | 200 | 0 | 104 | 80-120 | 208 | 0.385 | | |
| Magnesium | 189.3 | 100 | 200 | 0 | 94.7 | 80-120 | 193.1 | 1.99 | | |
| Manganese | 184.1 | 5.0 | 200 | 0 | 92.1 | 80-120 | 184.6 | 0.249 | | |
| Molybdenum | 191 | 10 | 200 | 0 | 95.5 | 80-120 | 191.6 | 0.303 | | |
| Nickel | 191.7 | 5.0 | 200 | 0 | 95.9 | 80-120 | 191.9 | 0.0834 | | |
| Selenium | 196.6 | 3.0 | 200 | 0 | 98.3 | 80-120 | 197.1 | 0.254 | | |
| Silver | 191.1 | 1.0 | 200 | 0 | 95.5 | 80-120 | 191.9 | 0.428 | | |
| Sodium | ND | 500 | 200 | 0 | 94.3 | 80-120 | 186.1 | 0 | | |
| Thallium | 191.6 | 3.0 | 200 | 0 | 95.8 | 80-120 | 192 | 0.177 | | |
| Titanium | 185 | 10 | 200 | 0 | 92.5 | 80-120 | 184 | 0.542 | | |
| Vanadium | 185.9 | 5.0 | 200 | 0 | 93 | 80-120 | 187.3 | 0.729 | | |
| Zinc | 194.8 | 5.0 | 200 | 0 | 97.4 | 80-120 | 195.3 | 0.226 | | |

**The following samples were analyzed in this batch:** 1401502-03a

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

## ALS Environmental

Date: 06-Feb-14

**Client:** Water Defense
**Project:** MCHM Analysis
**WorkOrder:** 1401502

## QUALIFIERS, ACRONYMS, UNITS

| Qualifier | Description |
|---|---|
| * | Value exceeds Regulatory Limit |
| a | Not accredited |
| B | Analyte detected in the associated Method Blank above the Reporting Limit |
| E | Value above quantitation range |
| H | Analyzed outside of Holding Time |
| J | Analyte detected below quantitation limit |
| n | Not offered for accreditation |
| ND | Not Detected at the Reporting Limit |
| O | Sample amount is > 4 times amount spiked |
| P | Dual Column results percent difference > 40% |
| R | RPD above laboratory control limit |
| S | Spike Recovery outside laboratory control limits |
| U | Analyzed but not detected above the MDL |

| Acronym | Description |
|---|---|
| DUP | Method Duplicate |
| E | EPA Method |
| LCS | Laboratory Control Sample |
| LCSD | Laboratory Control Sample Duplicate |
| MBLK | Method Blank |
| MDL | Method Detection Limit |
| MQL | Method Quantitation Limit |
| MS | Matrix Spike |
| MSD | Matrix Spike Duplicate |
| PDS | Post Digestion Spike |
| PQL | Practical Quantitaion Limit |
| SDL | Sample Detection Limit |
| SW | SW-846 Method |

| Units Reported | Description |
|---|---|
| mg/Kg | |

ALS Environmental

## Sample Receipt Checklist

Client Name: WATERDEFENSE-HURLEYVULL

Date/Time Received: 23-Jan-14 13:05

Work Order: 1401502

Received by: SEG

Checklist completed by: Ex. 6 - Personal Privacy — 27-Jan-14 (Date)

Reviewed by: Ex. 6 - Personal Privacy (eSignature) — 06-Feb-14 (Date)

Matrices:

Carrier name: UPS

| | | | |
|---|---|---|---|
| Shipping container/cooler in good condition? | Yes ☑ | No ☐ | Not Present ☐ |
| Custody seals intact on shipping container/cooler? | Yes ☐ | No ☐ | Not Present ☑ |
| Custody seals intact on sample bottles? | Yes ☐ | No ☐ | Not Present ☑ |
| Chain of custody present? | Yes ☐ | No ☑ | |
| Chain of custody signed when relinquished and received? | Yes ☐ | No ☑ | |
| Chain of custody agrees with sample labels? | Yes ☐ | No ☑ | |
| Samples in proper container/bottle? | Yes ☑ | No ☐ | |
| Sample containers intact? | Yes ☑ | No ☐ | |
| Sufficient sample volume for indicated test? | Yes ☑ | No ☐ | |
| All samples received within holding time? | Yes ☑ | No ☐ | |
| Container/Temp Blank temperature in compliance? | Yes ☑ | No ☐ | |
| Temperature(s)/Thermometer(s): | | | |
| Cooler(s)/Kit(s): | | | |
| Water - VOA vials have zero headspace? | Yes ☐ | No ☐ | No VOA vials submitted ☑ |
| Water - pH acceptable upon receipt? | Yes ☐ | No ☐ | N/A ☑ |
| pH adjusted? | Yes ☐ | No ☐ | N/A ☑ |
| pH adjusted by: | | | |

Login Notes: No official COC received. Logged samples as on containers. See Sample Photo. Client did not sign to relinquish samples. SEG

Client Contacted: | Date Contacted: | Person Contacted:

Contacted By: | Regarding:

Comments:

CorrectiveAction:

Ex. 5 - Deliberative

ALS Environmental

06-Feb-2014

Scott Smith
Water Defense
PO Box 304
Hurleyvulle, NY 12747

Tel: (518) 568-7036
Fax: (518) 568-2614

Re: Plant                                                    Work Order: **1401430**

Dear Scott,

ALS Environmental received 4 samples on 21-Jan-2014 11:10 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested.

QC sample results for this data met laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Laboratory Group. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 6.

If you have any questions regarding this report, please feel free to contact me.

Sincerely,

Rob Nieman

Electronically approved by: Shawn Smythe

Rob Nieman
Project Manager

**ALS Environmental** Date: 06-Feb-14

**Client:** Water Defense
**Project:** Plant
**Work Order:** **1401430**

## Work Order Sample Summary

| Lab Samp ID | Client Sample ID | Matrix | Tag Number | Collection Date | Date Received | Hold |
|---|---|---|---|---|---|---|
| 1401430-04 | Sample #4 1/12/14 Bathtub West Virginia Charleston | Bulk | | 1/12/2014 | 1/21/2014 11:10 | ☑ |

**Client:** Water Defense
**Project:** Plant
**Work Order:** 1401430

## Case Narrative

The analytical data provided relates directly to the samples received by ALS Laboratory Group and
for only the analyses requested.

QC sample results for this data met laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval
has been obtained from ALS Laboratory Group. Samples will be disposed in 30 days unless storage arrangements are made.

Samples Sample #1 Bathtub 1 12:30pm (1401430-01) and Sample #4 1/12/14 Bathtub West Virginia Charleston (1401430-02) were not analyzed

Ex. 5 - Deliberative

## ALS Environmental

**Date:** *06-Feb-14*

| | | | |
|---|---|---|---|
| **Client:** | Water Defense | | |
| **Project:** | Plant | **Work Order:** | 1401430 |
| **Sample ID:** | Sample #4 1/12/14 Bathtub West Virginia Charleston | **Lab ID:** | 1401430-04 |
| **Collection Date:** | 1/12/2014 | **Matrix:** | BULK |

| Analyses | Result | Qual | Report Limit | Units | Dilution Factor | Date Analyzed |
|---|---|---|---|---|---|---|
| **MERCURY BY CVAA** | | | **SW7471A** | | Prep Date: **2/4/2014** | Analyst: **KMW** |
| Mercury | ND | | 0.073 | mg/Kg | 1 | 2/5/2014 04:20 PM |
| **METALS BY ICP** | | | **SW6010B** | | Prep Date: **2/4/2014** | Analyst: **VAW** |
| Aluminum | ND | | 98 | mg/Kg | 1 | 2/5/2014 08:17 AM |
| Arsenic | ND | | 0.98 | mg/Kg | 1 | 2/5/2014 08:17 AM |
| Barium | ND | | 2.0 | mg/Kg | 1 | 2/5/2014 08:17 AM |
| Beryllium | ND | | 0.098 | mg/Kg | 1 | 2/5/2014 08:17 AM |
| Cadmium | ND | | 0.20 | mg/Kg | 1 | 2/5/2014 08:17 AM |
| **Calcium** | **4,700** | | **98** | **mg/Kg** | 1 | 2/5/2014 08:17 AM |
| Chromium | ND | | 0.39 | mg/Kg | 1 | 2/5/2014 08:17 AM |
| Cobalt | ND | | 0.98 | mg/Kg | 1 | 2/5/2014 08:17 AM |
| Copper | ND | | 0.98 | mg/Kg | 1 | 2/5/2014 08:17 AM |
| **Iron** | **27** | | **20** | **mg/Kg** | 1 | 2/5/2014 08:17 AM |
| Lead | ND | | 0.98 | mg/Kg | 1 | 2/5/2014 08:17 AM |
| Lithium | ND | | 2.0 | mg/Kg | 1 | 2/5/2014 08:17 AM |
| **Magnesium** | **360** | | **20** | **mg/Kg** | 1 | 2/5/2014 08:17 AM |
| Manganese | ND | | 0.98 | mg/Kg | 1 | 2/5/2014 08:17 AM |
| Molybdenum | ND | | 2.0 | mg/Kg | 1 | 2/5/2014 08:17 AM |
| Nickel | ND | | 0.98 | mg/Kg | 1 | 2/5/2014 08:17 AM |
| **Phosphorus** | **2.4** | | **2.0** | **mg/Kg** | 1 | 2/5/2014 08:17 AM |
| Platinum | ND | | 20 | mg/Kg | 1 | 2/5/2014 08:17 AM |
| Selenium | ND | | 0.59 | mg/Kg | 1 | 2/5/2014 08:17 AM |
| Silver | ND | | 0.20 | mg/Kg | 1 | 2/5/2014 08:17 AM |
| Sodium | ND | | 98 | mg/Kg | 1 | 2/5/2014 08:17 AM |
| Tellurium | ND | | 2.0 | mg/Kg | 1 | 2/5/2014 08:17 AM |
| Thallium | ND | | 0.59 | mg/Kg | 1 | 2/5/2014 08:17 AM |
| Tin | ND | | 2.0 | mg/Kg | 1 | 2/5/2014 08:17 AM |
| Titanium | ND | | 2.0 | mg/Kg | 1 | 2/5/2014 08:17 AM |
| Tungsten | ND | | 20 | mg/Kg | 1 | 2/5/2014 08:17 AM |
| Vanadium | ND | | 0.98 | mg/Kg | 1 | 2/5/2014 08:17 AM |
| Yttrium | ND | | 2.0 | mg/Kg | 1 | 2/5/2014 08:17 AM |
| **Zinc** | **50** | | **0.98** | **mg/Kg** | 1 | 2/5/2014 08:17 AM |
| Zirconium | ND | | 2.0 | mg/Kg | 1 | 2/5/2014 08:17 AM |

**Note:**

## ALS Environmental

Date: 06-Feb-14

**Client:** Water Defense
**Project:** Plant
**WorkOrder:** 1401430

## QUALIFIERS, ACRONYMS, UNITS

| Qualifier | Description |
|---|---|
| * | Value exceeds Regulatory Limit |
| a | Not accredited |
| B | Analyte detected in the associated Method Blank above the Reporting Limit |
| E | Value above quantitation range |
| H | Analyzed outside of Holding Time |
| J | Analyte detected below quantitation limit |
| n | Not offered for accreditation |
| ND | Not Detected at the Reporting Limit |
| O | Sample amount is > 4 times amount spiked |
| P | Dual Column results percent difference > 40% |
| R | RPD above laboratory control limit |
| S | Spike Recovery outside laboratory control limits |
| U | Analyzed but not detected above the MDL |

| Acronym | Description |
|---|---|
| DUP | Method Duplicate |
| E | EPA Method |
| LCS | Laboratory Control Sample |
| LCSD | Laboratory Control Sample Duplicate |
| MBLK | Method Blank |
| MDL | Method Detection Limit |
| MQL | Method Quantitation Limit |
| MS | Matrix Spike |
| MSD | Matrix Spike Duplicate |
| PDS | Post Digestion Spike |
| PQL | Practical Quantitaion Limit |
| SDL | Sample Detection Limit |
| SW | SW-846 Method |

| Units Reported | Description |
|---|---|
| µg/Kg | |
| mg/Kg | |

ALS Environmental

# Sample Receipt Checklist

Client Name: WATERDEFENSE-HURLEYVULL

Date/Time Received: 21-Jan-14 11:10

Work Order: 1401430

Received by: JNW

Checklist completed by: Ex. 6 - Personal Privacy (eSignature) — 22-Jan-14 (Date)

Reviewed by: Ex. 6 - Personal Privacy (eSignature) — 27-Jan-14 (Date)

Matrices:

Carrier name: FedEx

| | | | |
|---|---|---|---|
| Shipping container/cooler in good condition? | Yes ☑ | No ☐ | Not Present ☐ |
| Custody seals intact on shipping container/cooler? | Yes ☐ | No ☐ | Not Present ☑ |
| Custody seals intact on sample bottles? | Yes ☐ | No ☐ | Not Present ☑ |
| Chain of custody present? | Yes ☑ | No ☐ | |
| Chain of custody signed when relinquished and received? | Yes ☑ | No ☐ | |
| Chain of custody agrees with sample labels? | Yes ☑ | No ☐ | |
| Samples in proper container/bottle? | Yes ☑ | No ☐ | |
| Sample containers intact? | Yes ☑ | No ☐ | |
| Sufficient sample volume for indicated test? | Yes ☑ | No ☐ | |
| All samples received within holding time? | Yes ☑ | No ☐ | |
| Container/Temp Blank temperature in compliance? | Yes ☑ | No ☐ | |
| Temperature(s)/Thermometer(s): | 13.2 | | |
| Cooler(s)/Kit(s): | | | |
| Water - VOA vials have zero headspace? | Yes ☐ | No ☐ | No VOA vials submitted ☑ |
| Water - pH acceptable upon receipt? | Yes ☐ | No ☐ | N/A ☑ |
| pH adjusted? | Yes ☐ | No ☐ | N/A ☑ |
| pH adjusted by: | | | |

Login Notes:

---

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

CorrectiveAction:

wvgazette.com
the Charleston Gazette

February 7, 2014

# Suit targets DEP, DHHR inaction on chemical spill

by David Gutman

CHARLESTON, W.Va. -- A new legal action accuses two state government agencies of "collective dereliction of their duties" in not taking steps that could have prevented the Jan. 9 Elk River chemical spill that contaminated drinking water supplies for 300,000 West Virginians.

The emergency petition, filed with the state Supreme Court, says the state Department of Health and Human Resources and the Department of Environmental Protection ignored state laws and rules that required them to protect drinking water supplies.

The 36-page petition also says that state officials ignored warnings that such an incident was possible, and did not adequately responded to public concerns following the spill of Crude MCHM from the Freedom Industries' tank farm.

"Despite several clear warnings that West Virginia residents in the Kanawha Valley were at imminent risk of toxic exposure, respondents refused to take the actions necessary to protect the public health and the environment as required by statutes and regulations," says the petition, filed Friday.

Lawyers Jennifer Wagner and Bren Pomponio from the public interest law firm Mountain State Justice and Michael Becher and Joe Lovett from the group Appalachian Mountain Advocates filed the petition.

The petitioner are two nonprofit groups, Covenant House and the West Virginia Coalition Against Domestic Violence, that serve needy and in-crisis members of the community, and two area residents, Monique Watkins and Virginia Gardner.

In a statement, Covenant House, said, "This is a time of crisis. Our system has failed us. Our water supply was compromised. The public trust breached.

"This has affected every person in our community, and it has impacted the low-wage worker and homeless populations disproportionately," the statement said.

"Every day, more than 200 people count on Covenant House to help find housing, to take a shower, do their laundry, secure food and clothing, or some other emergency subsidence," the statement said. "It is a significant hardship for the low-wage worker to pay for bottled water to drink, to bathe their children in, and to cook."

Named as respondents in the petition were DEP Secretary Randy Huffman, DHHR Secretary Karen Bowling, and Dr. Letitia Tierney, the commissioner for DHHR's Bureau for Public Health.

Officials from the agencies did not immediately respond to requests for comment.

Among the specific allegations in the petition:

| Public health officials failed to require adequate emergency response and source-water protection plans for the Elk River water supply.

| The public health bureau did not maintain and update a comprehensive hazardous materials list that includes materials frequently used in West Virginia and appropriate emergency response procedures.

| DEP did not require Freedom Industries to submit pollution control and groundwater protection plans for its tank farm, despite its location 1.5 miles upstream from the public water intake, and did not properly inspect the site to ensure its safety.

| DEP has not kept the public informed about the cleanup of the Freedom Industries' site, leaving citizens with little information about "whether the spill site poses an ongoing threat to the Elk River and to the downstream drinking water intake."

| DEP is violating its duty to protect the existing uses of the Elk River, including its use as a public drinking water supply.

The petition notes that a 2002 DHHR report documented a variety of potential threats to the Elk River water supply, concluding that it was "highly susceptible to contamination" and identifying the Freedom site as a source of "large volumes of potential contamination."

"Although the [public health bureau] recognized the serious risk of potential spills of contaminants into the source water, including from the Freedom Industries site, it did not take any further action as recommended by the report, including determining the actual risk and consequences of a spill from the chemicals stored at the Freedom facility or other coordination with government agencies," the petition says.

Also, the petition notes that the state has never acted on a three-year-old recommendation by the U.S. Chemical Safety Board to create a new chemical accident prevention program.

The petition asks the Supreme Court to order the DHHR and the DEP to show why the agencies should not be forced to implement the chemical accident prevention program, require water protection plans from public water systems, properly monitor the impacts of the Jan. 9 spill, and report information from that monitoring to the public.

"Even weeks after the spill, the public has not received any information about the safety of their water except unsupported and general statements about a one part-per-million safe threshold," the petition says. "Many affected residents still feel unsafe drinking or cooking or bathing with their water and a survey of legislators revealed that none of the legislators who responded were drinking tap water in the affected area.

"The chemical spill and its impacts were avoidable and should have come to no surprise to respondents," the petition says. "Respondents have been advised on numerous occasions to take steps to prevent just such a disaster, and they were aware of the risk to the water supply and other threats to the public health of residents near chemical facilities in West Virginia.

"However, despite their clear duty to act, respondents chose to ignore clear recommendations and their own statutory and regulatory requirements to prevent the disaster," it says. "Further, in the wake of the spill, respondents have failed to meaningfully and accurately disseminate information and otherwise study the impacts of the spill on public health and the environment.

"In order to prevent similar disasters in the near future, respondents must be compelled to comply with their statutory duties to protect the lives, health, and livelihoods of West Virginians from chemical exposure."

*Reach Ken Ward Jr. at kw...@wvgazette.com or 304-348-1702.*

# Ex. 5 - Deliberative

# Ex. 5 - Deliberative

# Ex. 5 - Deliberative

# Ex. 5 - Deliberative

# Ex. 5 - Deliberative

Ex. 5 - Deliberative

wvgazette.com
the Charleston Gazette

**February 5, 2014**

# Feds don't plan to sample water in homes

by **Ken Ward Jr.**
Staff writer

CHARLESTON, W.Va. -- Federal officials who are visiting West Virginia today appear to have no plans for additional water sampling to determine if Crude MCHM from the Jan. 9 Elk River spill is still inside home plumbing systems across the region.

In interviews Tuesday, neither the U.S. Environmental Protection Agency nor the Centers for Disease Control indicated that they would conduct such tests or push the Tomblin administration to do so.

CDC officials said any such testing or advice to the state would be up to EPA. And EPA officials indicated that they are comfortable with the state's current testing, which does not include tap water inside residences.

In recent days, West Virginia residents have increasingly been asking why state officials from the Department of Health and Human Resources or the National Guard are testing water for Crude MCHM only at the water treatment plant, at fire hydrants and in some public buildings, such as schools.

EPA and CDC officials are to arrive in West Virginia today to meet with Gov. Earl Ray Tomblin, and then have a press conference to "provide an update -- in detail -- on what we have accomplished, where we stand now, and what actions we are taking as we move forward," according to Tomblin spokeswoman Amy Goodwin.

Several outside experts have expressed concern that the MCHM and other chemicals from the spill could have been absorbed by home plumbing systems, where it could continue to leach into water - even if in very small amounts -- for some undetermined amount of time.

Andrew Whelton, a University of South Alabama environmental engineer, has been testing water from area homes and arguing publicly that more information is needed about how chemicals from the spill interact with varying types of home pipes and tanks.

In an email interview Tuesday night, Whelton said that the Obama administration is making a mistake by not pushing for or conducting its own broader study of MCHM's presence in homes impacted by the spill.

"Chemical exposures occur inside homes at kitchen faucets, showers, etc., not at a hydrant," Whelton said. "Plumbing systems do not operate the same as buried pipe networks. There are clear differences."

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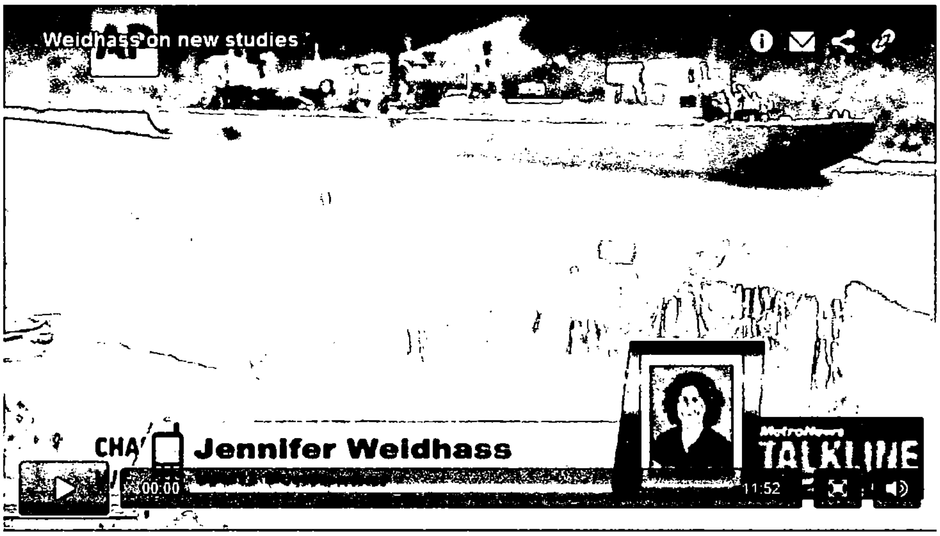
"It is baffling why any official would make those statements without hard data which they could have collected already," Whelton said.

*Reach Ken Ward Jr. at kw...@wvgazette.com or 304-348-1702.*

# Study: Flushing made little difference for MCHM levels in homes






By Shauna Johnson in News | February 05, 2014 at 12:17PM

**CHARLESTON, W.Va. —** A researcher at West Virginia University says preliminary data shows flushing did not change MCHM levels in the tap water in four homes, all of which were located in the nine county area where a do-not-use water order was issued following a Jan. 9 leak of crude MCHM and PPH along the Elk River.

Dr. Jennifer Weidhaas, with WVU's Civil and Environmental Engineering Department, lead a team that tested hot and cold lines along with exterior lines at the homes before and after the flushing protocol West Virginia American Water Company prescribed last month when individual water zones were cleared to resume regular water usage.

"It (MCHM) was detectable in all cases, both the cold and hot water lines, and, unfortunately, the flushing campaign was as not effective at reducing those concentrations as I think (West Virginia) American Water wanted them to do," said Weidhaas.

All of the MCHM levels in the homes tested, Weidhass noted, fell below the one part per million "safe" standard the Centers for Disease Control established both before and after flushing.

She said there could be any number of reasons why the levels of crude MCHM were higher, in some cases, in the tested homes after the three part flushing process — a recommendation to run hot faucets for 15 minutes, cold faucets for five minutes and exterior faucets for five minutes.

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"They could have pulled slightly higher concentration water to their houses as they were flushing, given how different people started to flush their houses during the day," explained Weidhaas. "Certain folks closer to the treatment plant may have flushed after folks that were farther away from the treatment plant."

Weidhaas is one of three scientists using $150,000 in emergency grant funding from the National Science Foundation to study the health effects of MCHM, the coal processing chemical that was being stored in the leaky tank at Freedom Industries. Up to now, the chemical has only been tested on rats.

In addition to Weidhaas' work to assess the extent of contamination in the drinking water, Andrew Whelton from the University of South Alabama is looking at the chemical's absorption into drinking water pipes, especially those in homes, while Andrea Dietrich from Virginia Tech is examining the environmental effects of MCHM.

In the coming months, Weidhaas said all of those involved will be working to, first, determine exposure levels to MCHM by mapping that exposure and, second, establish the actual toxic effects of the compound.

"Given the magnitude of this disaster and the number of people who were exposed, at this point, the researchers need to pick up the ball and answer different questions that an emergency responder, who's currently down in Charleston, doesn't have the time to answer," Weidhaas said on Wednesday's MetroNews "Talkline."

"The emergency responders and the CDC are going off the best information we have to date and now we need to fill in the gap, in the next few months, to determine, yes, that was an acceptable level or not."

Weidhaas continued, "We have to, at some point, trust in the science that's already there. I have to give credit to (West Virginia) American Water and the state folks down there, they're doing the best they can in an extremely difficult position," she said.

Officials with the National Science Foundation have called the Elk River chemical leak "one of the largest human-made environmental disasters in this century."


Shauna Johnson

**sjohnson@wvradio.com**

Shauna Johnson, a Fairmont native, is an award winning reporter who has been covering news in West Virginia for more than a decade.


(15) Comments

Name (required)

E-mail (will not be published) (required)


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7. **Licorice in the air–two Kanawha schools close**
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wvgazette.com
the Charleston Gazette

**February 5, 2014**

# Feds don't plan to sample water in homes

by **Ken Ward Jr.**
Staff writer

CHARLESTON, W.Va. -- Federal officials who are visiting West Virginia today appear to have no plans for additional water sampling to determine if Crude MCHM from the Jan. 9 Elk River spill is still inside home plumbing systems across the region.

In interviews Tuesday, neither the U.S. Environmental Protection Agency nor the Centers for Disease Control indicated that they would conduct such tests or push the Tomblin administration to do so.

CDC officials said any such testing or advice to the state would be up to EPA. And EPA officials indicated that they are comfortable with the state's current testing, which does not include tap water inside residences.

In recent days, West Virginia residents have increasingly been asking why state officials from the Department of Health and Human Resources or the National Guard are testing water for Crude MCHM only at the water treatment plant, at fire hydrants and in some public buildings, such as schools.

EPA and CDC officials are to arrive in West Virginia today to meet with Gov. Earl Ray Tomblin, and then have a press conference to "provide an update -- in detail -- on what we have accomplished, where we stand now, and what actions we are taking as we move forward," according to Tomblin spokeswoman Amy Goodwin.

Several outside experts have expressed concern that the MCHM and other chemicals from the spill could have been absorbed by home plumbing systems, where it could continue to leach into water - even if in very small amounts -- for some undetermined amount of time.

Andrew Whelton, a University of South Alabama environmental engineer, has been testing water from area homes and arguing publicly that more information is needed about how chemicals from the spill interact with varying types of home pipes and tanks.

In an email interview Tuesday night, Whelton said that the Obama administration is making a mistake by not pushing for or conducting its own broader study of MCHM's presence in homes impacted by the spill.

"Chemical exposures occur inside homes at kitchen faucets, showers, etc., not at a hydrant," Whelton said. "Plumbing systems do not operate the same as buried pipe networks. There are clear differences."

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IMMEDIATE CORRECTION ADVISED. There was an incorrect report on this evening's broadcast of Nightly News. Lester Holt reported that drinking water samples from 6 schools in the Charleston, WV area showed MCHM levels above the "safe level." This is not correct. Sample results from those schools were above the detection limit for MCHM (0.010 parts per million, or 10 parts per billion), but they are far below the safe level (1 part per million, or 1,000 parts per billion). Please correct this immediately, as this is likely causing significant alarm among area residents. You can check the results directly at http://www.dhsem.wv.gov/Documents/SCHOOL%20SAMPLE%20COLLECTION%20AS%20OF%202330_31JAN14.pdf

## binetti, victoria

**From:** binetti, victoria
**Sent:** Thursday, January 30, 2014 5:58 PM
**To:** Miller, Linda
**Cc:** Capacasa, Jon; Arguto, William; Wisniewski, Patti-Kay
**Subject:** RE: types of assistance

Linda, I added a bullet below. Also, check second-to-last bullet, I think two items got merged.—Vicky

---

Below is a list of the types of assistance EPA has been providing. Thanks to staff for assistance in developing. Comments?

**Ex. 5 - Deliberative**

Linda Miller
EPA Region III
Office of State and Congressional Relations
1650 Arch Street
Philadelphia, PA 19103

## binetti, victoria

**From:** binetti, victoria
**Sent:** Monday, February 03, 2014 2:31 PM
**To:** Ryan, Daniel; Capacasa, Jon
**Cc:** Arguto, William
**Subject:** Potential EPA assistance

Suggestions (Bill & Jon pls edit as needed):

These are areas where EPA could provide direct technical assistance. External expertise may be available in these areas, but would likely not be superior to EPA's expertise, and could be expensive, and without obvious source of funding:

**Ex. 5 - Deliberative**

-----Original Message-----
From: Ryan, Daniel
Sent: Monday, February 03, 2014 1:16 PM
To: Capacasa, Jon; binetti, victoria
Subject: Need your assistance ASAP

See last line in this request, below. Will need a writeup of recent meeting.

it seems that we might be better poised to offer assistance if we knew more clearly what is the current state of the site. The daily reports have been helpful but it is hard to ascertain whether the site is really stabilized. Shawn, could you have your folks pull together what the current situation from a site stability and monitoring standpoint is (ie., do we know if the tank or the underlying containment is still leaking, what is the existing monitoring scheme, it the interceptor trench and boom working). I think that would help us inform what EPA can bring to the table to bear from a technical assistance perspective versus an independent scientific review.

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# Washington Aqueduct Future Treatment Alternatives Study

# PANEL OF EXPERTS

**Dr. Phil Singer, Chair**
**University of North Carolina**
Dr. Singer has a BS in civil engineer from The Cooper Union, an MS in sanitary engineering from Northwestern University, and a PhD in environmental sciences and engineering from Harvard University. Dr. Singer was head of the Water Resources Engineering Program at the University of North Carolina for 19 years and currently directs UNC's Drinking Water Research Center. His research has focused on aquatic chemistry and chemical aspects of water and wastewater treatment. Dr. Singer is the president of the Association of Environmental Engineering and Science Professors Foundation and the 2009 recipient of the Pioneer Award from the Water Environment Federation in recognition of his outstanding contribution to the chlorine disinfection field.

**Joel Bluestein**
**ICF International**
Mr. Bluestein is a senior vice president of ICF international. He holds a mechanical engineering degree from the Massachusetts Institute of Technology and is a registered professional engineer. He is a nationally recognized expert on the impacts of environmental and energy regulation, with over 30 years of experience in the energy and environmental arenas. Mr. Bluestein has been directly involved in the development of most of the recent emission trading programs and participates in the national debate on new environmental policies and their energy implications. Has testified before Senate Environment and Public Works Committee on natural gas supply issues and their implications for multi-pollutant regulation of the electric generating sector.

**Plato Chen**
**Washington Suburban Sanitary Commission**
Mr. Chen is a Senior Scientist in the Washington Suburban Sanitary Commission's (WSSC) Environmental Group. He has been at WSSC for nearly 9 years, and prior to that worked as an environmental engineering consultant with O'Brien & Gere Engineers. He has almost 20 years of experience specializing in water treatment process and distribution system engineering and optimization as well as source water protection. He has a BS in chemical engineering and an MS in environmental engineering, both from the University of Michigan. He is a licensed PE in the State of Maryland.

**Mike Hotaling**
**Newport News Waterworks**
Mr. Hotaling is the manager of water production and treatment, laboratory, SCADA and distribution systems for the City of Newport News Waterworks. He has extensive experience in Federal and State regulations pertaining to drinking water in the treatment plant and distribution system. He has presented several papers at national conferences related to the implementation of drinking water rules. He is a licensed PE in the State of Virginia.

**Dr. Steve Hrudey**
**University of Alberta**
Dr. Hrudey is currently a professor of environmental health sciences in the Department of Public Health Sciences at the University of Alberta. He received a bachelor's degree from the University of Alberta in Edmonton and a master's degree and a doctorate from the University of London. Chair of the NATO Priority Panel on Environmental Security, Dr. Hrudey has more than 30 years experience in interdisciplinary environmental health research and is coauthor of the book, Safe Drinking Water: Lessons from the Recent Outbreaks in Affluent Nations.

**Dr. Kimberly Jones**
**Howard University**
Dr. Kimberly L. Jones is Professor of Civil Engineering at Howard University. She received her Bachelor's degree in Civil Engineering from Howard University, her Masters from the University of Illinois in Champaign, IL and her Ph.D. from The Johns Hopkins University. Dr. Jones has over 15 years of combined experience in developing membrane processes for environmental and biomedical applications, physical-chemical processes for water and wastewater treatment and nanotechnology. She has been on the faculty at Howard University since 1996. Dr. Jones has received awards from the National Technical Association, University of Illinois Department of Civil Engineering and Essence Magazine. She is on the Water Science and Technology Board and has served on several committees of the National Academy of Sciences, on the Board of Directors of the Association of Environmental Engineering and Science Professors and as an associate editor of the Journal of Environmental Engineering.

**Dr. Audrey Levine**
**US EPA**
Dr. Levine is currently the EPA's national program director for drinking water. She has a doctorate in civil engineering from the University of California at Davis, and a master's degree in Public Health from Tulane University. She has extensive research experience in water quality, water treatment and distribution systems, treatment technologies, and water reuse. Prior to joining the EPA, she was a faculty member of the Department of Civil and Environmental Engineering at the University of South Florida in Tampa. She is a Diplomat of Environmental Engineering (DEE) and a registered professional engineer (P.E.). She has more than 20 years of broad-based, technical experience within academic, government, industry, and consulting settings.

**Dr. Alexa Obolensky**
**Philadelphia Water Department**
Dr. Obolensky received her MS and PhD in Environmental Chemistry from the University of North Carolina. Employed with the Philadelphia Water Department (PWD) since 1995, Alexa is currently in charge of research programs at the utility's central laboratories. Her work at PWD has included implementing water quality monitoring and research projects, managing the utility's emerging contaminant program, tracking drinking water regulatory issues, and providing expertise and general guidance on issues of water treatment chemistry, water quality monitoring, and data analysis. Dr. Obolensky is active with AWWA's Office of Regulatory Affairs. She currently serves on the Water Research Foundation's Expert Panel for the EDC/PPCP Strategic Initiative. Dr. Obolensky has published several peer-reviewed manuscripts and book chapters on DBPs, and was co-editor of Information Collection Rule Data Analysis.

**Dr. Vern Snoeyink**
**University of Illinois**
Dr. Snoeyink holds a BS in civil engineering, a MS in sanitary engineering, and a PhD in water resources engineering, all from the University of Michigan. He is a Professor Emeritus of the department of Civil and Environmental Engineering at the University of Illinois. Dr. Snoeyink's research has focused on drinking water quality control, especially in the fields of organic and inorganic contaminant adsorption, as well as distribution system water quality. Dr. Snoeyink served as President of the Association of Engineering and Science Professors and currently is on the Editorial Advisory Board of AQUA. He has received number awards for his research, including the Association of Environmental Engineering and Science Professors Distinguished Lectureship and the Research Award from the American Water Works Association.

**Dr. Scott Summers**
**University of Colorado**
Dr. Summers is a professor in the Department of Civil, Environmental and Architectural Engineering at the University of Colorado. He holds a BS in civil engineering and an MS in environmental engineering from the University of Cincinnati, and a PhD in environmental engineering and science from Stanford University. He has over 34 years of experience in the field of environmental engineering. His main research interests are in the area of drinking water quality and treatment with special interest in natural organic matter, disinfection by-products, micro-pollutants, inorganics and taste and odor as related to activated carbon, filtration, membrane processes, ion exchange, coagulation, biological treatment, disinfectant behavior and distribution systems. He has co-authored over 200 articles on drinking water quality and treatment.

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Advisory / Decision Making
↳ to whom?

PH?
Treatment

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**January 29, 2014**

# Marshall scientist found formaldehyde in Charleston water

by **David Gutman**

CHARLESTON, W.Va. -- A Marshall University environmental scientist and member of the state Environmental Quality Board said today that he has found formaldehyde in local water samples and that the continued lack of data on the chemical that leaked into the Elk River is very concerning.

"It's frightening, it really is frightening," said Scott Simonton, a member of the EQB, which oversees water permits for the state Department of Environmental Protection. "What we know scares us, and we know there's a lot more we don't know."

Simonton told a joint legislative committee on water resources that his family is still not drinking or cooking with the water, weeks after the water company and government officials have said it is safe for all uses.

"Your level of what risk you will accept is up to you, I can only tell you what mine is and I'm not drinking the water," Simonton said. "The formaldehyde had me personally a little freaked out."

Formaldehyde is a carcinogen, a chemical that causes cancer.

4-methylcyclohexanemethanol, or "Crude MCHM," the chemical compound that leaked into the Elk River, has methanol as one of its main components. Methanol breaks down into formaldehyde, Simonton said.

Simonton said that he found traces of formaldehyde in water samples taken from Vandalia Grille in downtown Charleston.

Simonton said he was still concerned with the 1 part per million standard for Crude MCHM that the federal Centers for Disease Control have said is safe in water for everyone except pregnant women.

He stressed how little is still known about the chemical.

"We don't know what happens to this stuff once it gets into the environement," he said. "What happens when it reacts with makeup or soap or shampoo or anything lese that we come into contact with everyday?"

The CDC's standard was based on several proprietary studies done on rats by Eastman Chemicals, which makes Crude MCHM.

Simonton said that in one study it couldn't even be determined what the cause of death was for the rats because there were so many different things happening to them. For another study, Eastman switched the species of rat after initial testing gave nearly a 100 percent mortality rate.

He also said that the flushing period recommended by West Virginia American Water and state officials wasn't enough, and that the chemical is sticking to pipes in the system.

Sen. John Unger, chair of the committee, summed up Simonton's findings.

"I think we're in a little bit of shock because of this," said Unger, D-Berkeley.

*Reach David Gutman at david.gut...@wvgazette.com or 304-348-5119.*

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# State of West Virginia
# Source Water Assessment and Protection Program

# Source Water Assessment Report

**WVAWC - Kanawha Valley**
**Kanawha County**
**PWSID: WV3302016**

**Prepared by:**

**West Virginia Department of Health and Human Resources**
**Bureau for Public Health**
**Office of Environmental Health Services**
**Source Water Protection Unit**

**Date: April 2002**

**Surface Water Public Water Supply Systems**
**Source Water Assessment and Protection Program (SWAPP)**
**Susceptibility Report**

Prepared by the West Virginia Bureau for Public Health, Source Water Assessment and Protection Unit

Date Prepared: Thursday, April 25, 2002

## What is the Purpose of a Susceptibility Report?

A susceptibility report identifies the most significant potential contaminant sources that could threaten the quality of your public water supply. Your susceptibility ranking does not imply poor water quality. Regular water tests best reflect actual water quality. This report will be used by public water supply systems with a surface water source. In addition, this report will enhance West Virginia's existing watershed approach to water quality improvement and protection. Table 1 provides you information on your public water supply.

## What is SWAPP?

The SWAPP, established under the Safe Drinking Water Act, requires every state to:

- inventory land uses within the recharge areas of all public water supplies;
- assess the susceptibility of drinking water sources to contamination from these land uses; and
- publicize the results to provide support for improved protection of sources.

**Table 1: Public Water Supply (PWS) Information**

| | |
|---|---|
| PWS Name | WVAWC-Kanawha Valley |
| PWS Address | P.O. Box 1906 Charleston WV 25301 |
| PWS ID Number | WV3302016 |
| County | Kanawha |
| System Type | Community |

The West Virginia Bureau for Public Health (BPH) is undertaking this task. The rankings of susceptibility of your intake (s) to potential contamination are listed in Table 2.

Table 2: Intake Information

| Facility Name | Source Name | Design Meets Regulations | Susceptibility Ranking |
|---|---|---|---|
| WVAWC-Kanawha Valley | Elk River | Yes | High |

The BPH Central Office assessed the source, West Virginia American Water Company (WVAWC)-Kanawha Valley. A file review and field survey were used to conduct the assessment.

## What is my Source Water Protection Area (SWPA)?

Unlike ground water aquifers, which have a natural protective layer above them, all surface waters are susceptible to contamination because they are exposed at the surface and lack a protective barrier from contamination. Accidental spills, releases, sudden precipitation events that result in overland runoff, or storm sewer discharges can allow pollutants to readily enter the source water and potentially contaminant the drinking water at the intake. Because of this, the SWPA consists of two types of delineations.

- **Watershed Delineation Area**

The first type of delineation is the Watershed Delineation Area (WSDA). Figure 1 shows the extent of the WSDA, which covers approximately 1,527 square miles in the Elk River Watershed. The WSDA includes the entire watershed area upstream of the intake up to the boundary of the West Virginia state border, or a topographic boundary. The perimeter of the catchment area provides the water to the water supply intake.

- **Zone of Critical Concern**

The second type of delineation is the Zone of Critical Concern (ZCC). Figure 2 shows the ZCC area, which covers approximately 5,969 acres. The ZCC is a corridor along streams within the WSDA area that warrants a more detailed inventory and management due to its proximity to the surface intake and to the susceptibility to potential contaminants. The ZCC is calculated using a mathematical model that accounts for stream flows, gradient, and area topography. The length of the ZCC is based on a five hour time of travel. The ZCC width is 1000 feet from each bank of the principal stream and 500 feet from each bank of the tributaries draining into the principal stream.

## What is Susceptibility?

Susceptibility is a measure of your intake's potential for contamination from land uses and activities within the SWPA at concentrations that pose a concern. The purpose of the susceptibility analysis is to provide a pointer to what action a public water system should take to further define and reduce susceptibility. This may include recommendations for a more detailed inventory and assessment, monitoring work, or an indication of the type and intensity of source water and other protection activities needed.

The possibility of a release from potential contaminant sources is greatly reduced if best management practices (BMP's) are used. However, the susceptibility determination for your intake did not take into account whether BMP's are being used.

Susceptibility of a drinking water intake does not mean a customer will drink contaminated water. Water Suppliers protect drinking water by monitoring and treating water supplies, and using BMP's and source water protection measures to ensure that safe water is delivered to the tap.

## How Was The Water Supply Susceptibility Determined?

Your intake (s) susceptibility is based on the following:

**<u>Resource Characterization</u>**

The purpose for conducting the Resource Characterization analysis of the delineated SWPA is to obtain an understanding of its physical, biological, chemical, and hydrological characteristics. Four resource characteristics were evaluated:

- The potential for surface runoff to occur;
- The ease that surface runoff transport material can be delivered into the stream;
- The movement through the SWAP area; and
- The biological and chemical health of the surface water resource in the SWAP area.

- **Potential for Surface Runoff to Occur**

The soil types present in the watershed area and the associated soil properties have a direct influence on the potential for surface runoff to occur. As infiltration rate of soil increases, (more precipitation soaking in rather than running off) the contaminant load associated with the reduced runoff should decrease. Table 3 provides a summary of the associated soil groups.

Table 3: Summary of Soil Associations in the WSDA

| Soil Associations | Soil Drainage | Topographic Setting |
|---|---|---|
| Kanawha-Hackers | Well drained | Gently sloping |
| Gilpin-Upshur-Vandalia | Well drained | Gently sloping to very steep |
| Clymer-Gilpin-Dekalb | Well drained | Very steep |
| Buchanan-Chavies-Pope | Moderate to Well drained | Steep to nearly level |
| Gilpin-Upshur-Buchanan | Moderate to Well drained | Very steep |
| Gilpin-Dekalb-Buchanan | Moderate to Well drained | Very steep |
| Calvin-Belmont-Mecksville | Well drained | Gently sloping to very steep |
| Potomac-Tioga-Holly | Well and Poorly drained | Nearly level |
| Mandy-Snowdog-Gauley | Moderate to Well drained | Strongly sloping to very steep |
| Cateache-Shours-Belmont | Well drained | Gently sloping to very steep |

- **Ease of movement of material into the Stream System (Rate of Overland Material Transport):**

The size, shape, and slope of the SWAP area have a direct influence on material transported by surface runoff. In general, the longer the overland travel distance and travel time that surface runoff has taken in order to reach a stream channel, the greater the chance it has to deposit and filtrate the contaminants that may occur. Table 4 provides an analysis of the size, shape, and slope.

Table 4: Hydrologic Setting

| | |
|---|---|
| Size of WSDA Area ($mi^2$) | 1,527 |
| Shape of WSDA Area | Long & Narrow |
| Stream Length (Main Stem) (mi) | 186 |
| Average Watershed Slope | 10 to 30 % |

- **Movement of Water through the Watershed Area**

A number of physical and natural factors can influence the movement of water through the SWAP area. The pattern and development of the drainage network of the SWAP area directly influence the rate of water movement. Evaluation of the hydrologic cycle will provide an indication of the amount of annual rainfall that is absorbed into the ground or becomes runoff. Table 5 summarizes the total mileage of streams contained in the WSDA, average stream gradients of the main stem, average rainfall, the nearest relevant USGS stream gauge, distance to gauge, topographic position of gauge, annual mean discharge, high flow, and low flow.

Table 5: Movement of Water

| | |
|---|---|
| Number of Stream Miles | 2,051 |
| Average Stream Gradient (Main Stem) | 11.13 ft/mi |
| Average Rainfall | 44 |
| Nearest Relevant USGS Stream Gauge | 031197000 |
| Distance to Relevant USGS Stream Gauge (mi) | 22 |
| USGS Stream Gauge Topographic Position | Upstream |
| Annual Mean Discharge (cfs) | 3,259 |
| High Flow (cfs) | 158,000 |
| Low Flow (cfs) | 595 |

- **Review of Water Quality Data**

In order to characterize the condition of the surface water within the watershed, the available chemical and biological water quality data was reviewed. This data was collected as part of the BPH and the West Virginia Department of Environmental Protection (DEP) implementation of the federal Safe Drinking Water Act and Clean Water Act. Water quality data was evaluated to help provide direct pointers to a source of contamination and to direct the focus for additional source evaluations. Additionally, immediate source water protection efforts will be identified by this review.

Available water quality data includes test results from treated drinking water, finished water, and untreated source water (raw water) conducted by the water supplier; ambient water chemistry; biological criteria and monitoring (bacteria, macroinvertibrates and fish); and habitat evaluation. The sampling requirements for public water systems vary depending on the type of system and the federal regulated testing requirements. Therefore, a lack of water quality impacts may indicate the lack of a certain type of sampling rather than a lack of contamination.

### Summary of Raw and Finished Water Quality Results from Public Water System

Water sampling conducted by West Virginia American Water Company indicates that raw water turbidity maximums appear to have increased significantly over the past two years, based on the five years of data reviewed. The WVAWC-Kanawha Valley Plant takes a raw water bacteriological sample almost on a daily basis; which is not required by regulation. These tests indicate elevated levels during periods of high water.

There have been no occasions when the observed concentrations have been above the established MCLs for these parameters in the finished water. For additional information on the finished water quality, please review the consumer confidence report for a yearly summary of the water quality.

### Summary of Chemical and Biological Water Quality Results from the West Virginia DEP

In 2000, the DEP conducted biological and chemical water quality monitoring on 153 streams totaling 832 miles in the Elk River watershed for the 305b report, as a requirement of the federal Clean Water Act. Two hundred and twenty miles (26%) were fully supporting their overall designated uses. Considering major and moderate/minor impacts, the principal causes of impairment in the watershed are metals, siltation, and habitat alteration (non-flow). Additional significant causes of impairment are pH and Fecal Coliform. Considering major and moderate/minor impacts, the principal sources of pollution in the watershed are unknown source, petroleum activities, and abandoned mining. During this reporting cycle, 460.41miles of stream in the Elk River watershed were monitored for toxics. Of these, 65.09 miles (14.1%) had elevated levels of toxics.

The DEP performed an ecological assessment of the Elk River and its tributaries in 1997. Assessments at each site included measurements of physical attributes of the stream and riparian zone, observations of activities and disturbances in the surrounding area, water quality analysis, and benthic macroinvertebrate collection. Of the 145 sites sampled, 26 were impaired, 14 were potentially impaired, 95 were unimpaired, and 10 were collected by incomparable methods and could not be scored.

### Summary of Other Available Chemical and Biological Water Quality Data

Not Available

## POTENTIAL SIGNIFICANT CONTAMINANT SOURCES (PSCS'S):

#### Inventory of Potential Significant Contaminant Sources

The purpose of providing an inventory of certain types of land uses, potential significant contaminant sources, and activities within the SWAP area is to aid in reducing the risk posed to the public drinking water supply. The following subsections provide information regarding the methodology used to generate the inventories.

The inventory portion of the SWAP consists of two steps:

- The first step is the broad inventory based primarily on regulated and existing databases. The inventory consists of a general land use analysis, the identification of regulated activities in the delineated WSDA areas, and an analysis of road and rail crossings adjacent to the streams in the WSDA area.

- The second step is the detailed inventory of PSCS's in the ZCC. The detailed source inventory is conducted to identify PSCS's that were not captured in the broad regulated source inventory and to field verify the PSCS's in the ZCC. PCS's located during the inventory are found on Figure 2.

A detailed risk-assessment of the PSCS's was beyond the scope of this survey because of minimal data and resources. Local decision makers should do the detailed risk analysis because they are better suited to make the bridge from assessment work to protective strategies. The West Virginia SWAP program can provide guidance to the decision makers and help in prioritizing the PSCS sources.

- **Existing (primarily regulated) Database Review**

Table 6 is a summary of existing PSCS's based on public information obtained from various federal, state, and local agencies that maintain environmental regulatory databases. These databases provide information about the regulatory status of a property and incidents involving use, storage, spilling or transportation of oil, and hazardous materials.

Table 6: Summary of existing (primarily regulated) PSCS's

| | NUMBER | PERCENT |
|---|---|---|
| WSDA | 53 | 100 |
| ZCC | 26 | 49 |

- **Summary of the Detailed Inventory**

Table 7 is a summary of the detailed inventory of potential contaminant sources in the ZCC. The detailed source inventory was conducted to identify PSCS's that were not identified in the existing database review and to verify the location of the PSCS within the ZCC. Additional potential significant contaminant sources that were identified in detailed inventories of the ZCC consist of commercial activities (Shell Gas Station, Sun Belt Rentals), municipal operations (City of Charleston Sewage Lift Station, Road Salt Storage), and industrial operations (Allegheny Power Company, Pennzoil Manufacturing Plant). Of these PSCS's, some of the industrial sources may have large volumes of potential contaminant stored.

Table 7: Summary of PSCS within the ZCC

| Potential Contaminant Source | TOTAL PSCS'S | PERCENT |
|---|---|---|
| AGRICULTURE | 1 | 2 |
| RESIDENTIAL | 0 | 0 |
| MUNICIPAL | 4 | 8 |
| COMMERCIAL | 39 | 76 |
| INDUSTRIAL | 7 | 14 |

- **Transportation Network**

A summary of the transportation network is shown in Table 8. This information can be used to aid in planning for transportation related accidents that could result in contamination of the source water in the delineated WSDA. Table 9 is a summary of the transportation network stream crossings in the WSDA. Please note that miles of train tracks could be less due to decommissioning of tracks.

Table 8: Transportation Network Summary for WSDA

| | Within 100 feet of stream | Total |
|---|---|---|
| Miles of Interstate | 0.08 | 83 |
| Miles of Primary | 0.05 | 71 |

| | | |
|---|---|---|
| Miles of Secondary | 1.4 | 379 |
| Miles of Train Tracks | 21 | 212 |

Table 9: Transportation Network Stream Crossings in the WSDA

| | Train Tracks | Interstate | Primary Roads | Secondary Roads |
|---|---|---|---|---|
| Number of Stream Crossings | 180 | 47 | 44 | 224 |

- **General Land Use**

The general land use analysis will provide an indication of which land uses predominate throughout the SWAP area, near the intake, or adjacent to the rivers, streams, lakes, and reservoirs. The land use in the SWAP area is shown in Table 10.

Table 10: General Land Use

| LAND USE | WSDA Area (Acres) | WSDA % of Total | ZCC Area (Acres) | ZCC % of Total |
|---|---|---|---|---|
| Shrub Land | 11,343 | 1.00 | 102 | 2.00 |
| Woodland | 888,568 | 91.00 | 2,754 | 46.00 |
| Water | 10,314 | 1.00 | 797 | 13.00 |
| Roads | 1,201 | 0.10 | 133 | 2.00 |
| Power lines | 2,312 | 0.20 | 16 | 0.30 |
| Urban | 11,633 | 1.00 | 1,745 | 29.00 |
| Agriculture | 46,476 | 5.00 | 406 | 7.00 |
| Barren | 5,250 | 0.50 | 15 | 0.30 |
| Wetland | 401 | 0.04 | 1 | 0.02 |

## SWAPP Area Assessment and Protection Activities

Analysis of the Resource Characterization and potential significant contaminant sources of the SWAP area for the WVAWC-Kanawha Valley indicates that the water supply is susceptible to possible future contamination based on the following:

- ✓ The long narrow shape, steep topographic setting, and the large size of the WSDA present an increased potential for contamination. An important flood control/recreational impoundment is located on the Elk River at Sutton in Braxton County approximately 100 miles upstream of the intake. In addition, the large number of stream crossings (495 total) provides the opportunity for an accidental release/spill of material to easily get directly into the stream drainage network. Source water protection efforts should be directed toward the establishment of an effective and efficient emergency response plan if one does not currently exist.
- ✓ Current land use practices appear to be having an adverse impact on the ecological health of the Elk River Watershed. Coal, oil, gas, timbering, and sandstone quarries are among the industries present. Agriculture is dominated by livestock and related products. This is evidenced by of the 832.41 miles assessed in the DEP 303b report; only 26.5% were fully supporting the overall designated use. Higher bacteria levels are generally concentrated around populations centers, caused by regulated or unregulated discharges. In addition, the health of the Elk River may be impacted by a number of regulated and unregulated point and non-point sources in the ZCC and WSDA.

**Recommendations:**

- ✓ Protection efforts should focus on the collection of additional information on the point and non-point sources present to evaluate the risk;
- ✓ Work with the Department of Health and Human Resources, other state agencies and local officials to make sure your intake is included in local regulations and inspections efforts;
- ✓ Restrict access to the intake area and post the area with Drinking Water Protection Area signs;
- ✓ Address any biological contaminant issues; and
- ✓ Protection options need to be actively considered to further evaluate and manage all potential contaminant sources and the WVAWC-Kanawha Valley public water supply should place a high priority on protecting its supply source.

**NEXT STEP – SWAP Protection Plan**

The next step in source water protection planning is to prepare a SWAP protection plan. The SWAP protection plan incorporates this source water delineation assessment report and three additional sections: Contingency Planning, Alternative Sources, and Management Planning.

**<u>Contingency Planning</u>**

A contingency plan documents the system's planned response to interruption of the source water supply.

**<u>Alternative Sources</u>**

Information pertaining to alternative water sources focusing on long-term source replacement should the system be required to develop a new source of water due to contamination (or other reasons). This section outlines the most likely sources that can be used as an alternate water source.

**<u>Management Planning</u>**

Management planning is the most important element of SWAP. The management plan identifies specific activities that will be pursued by the system to protect their water resources. The system will benefit by taking a proactive approach to source water protection in their watersheds. It is anticipated that most of the management effort will focus on coordination with government agencies and periodic surveys of the watersheds. It may be necessary to conduct a limited number of special studies to determine actual risk and consequences for selected contaminant sources. This information may be needed before decisions can be made on management activities.

**Need additional information?**

Additional information or sources of information can be obtained by calling or visiting the BPH web site at www.wvdhhr.org/bph/swap or phoning 304-558-2981.

**Glossary:**

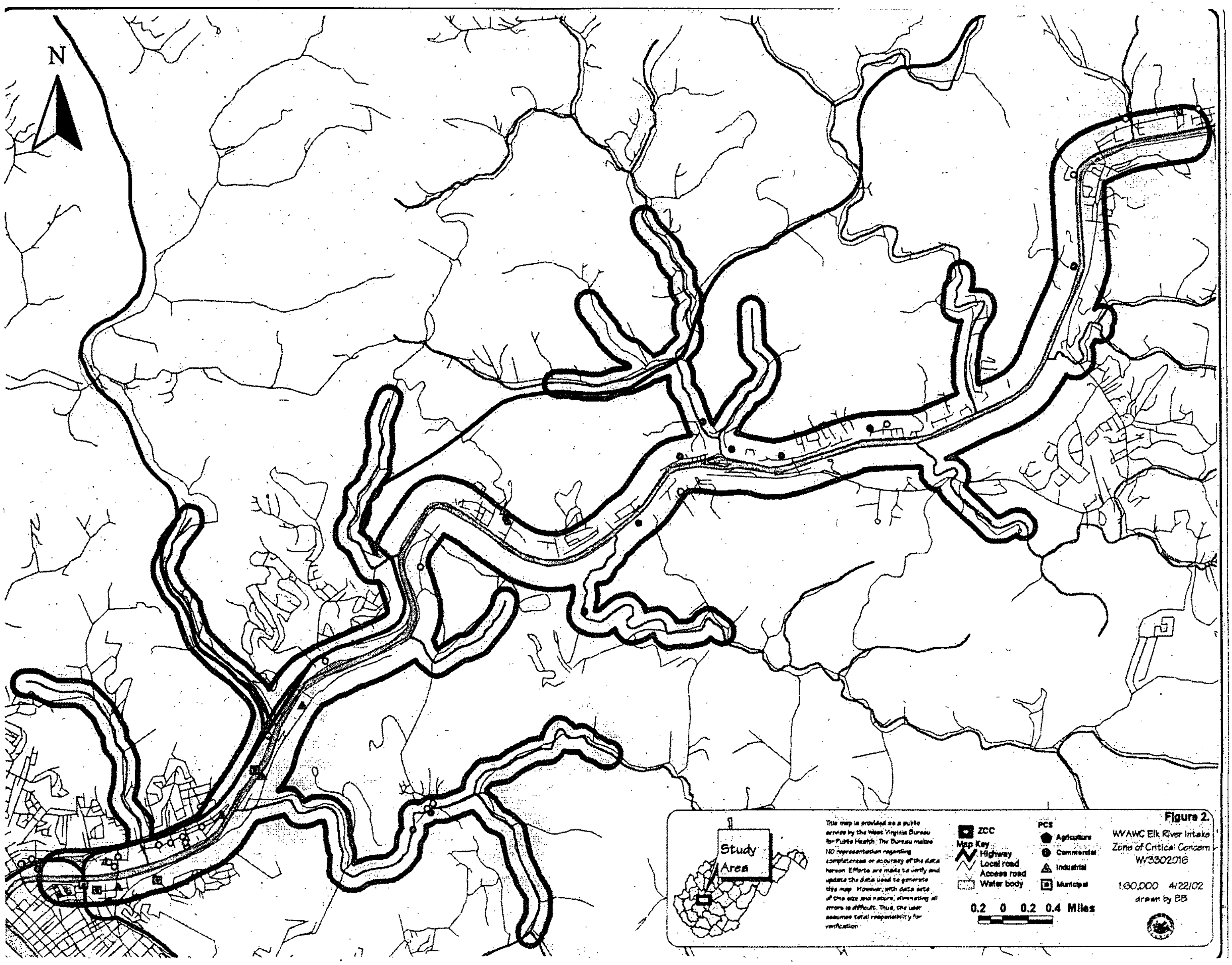
Best Management Practices (BMP's) are operational procedures used to prevent or reduce pollution.

Public Water System (PWS) is a system for the provision to the public of pipe water for human consumption, if such system has at least 15 service or regularly serves an average of at least 25 individuals daily at least 60 days of the year.

Water Quality Data is used to help assess both the potential pathogen contamination and other compliance monitoring (Nitrates) parameters associated with public water supply wells.

Potential Significant Contaminant Source (PSCS) is a facility or activity that stores, uses, or produces chemicals or elements, and has the potential to release contaminants identified in the state program within a source water protection area in an amount, which could contribute significantly to the contaminants of the source waters of the public water supply.

***Disclaimer - The coverage's presented in this program are under constant revision as new sites or facilities are added. They may not contain all the potential or existing sites or facilities. The West Virginia Bureau for Public Health is not responsible for the use or interpretation of this information. Please report any inaccuracies on either the map or inventory by phoning 304-558-2981.***

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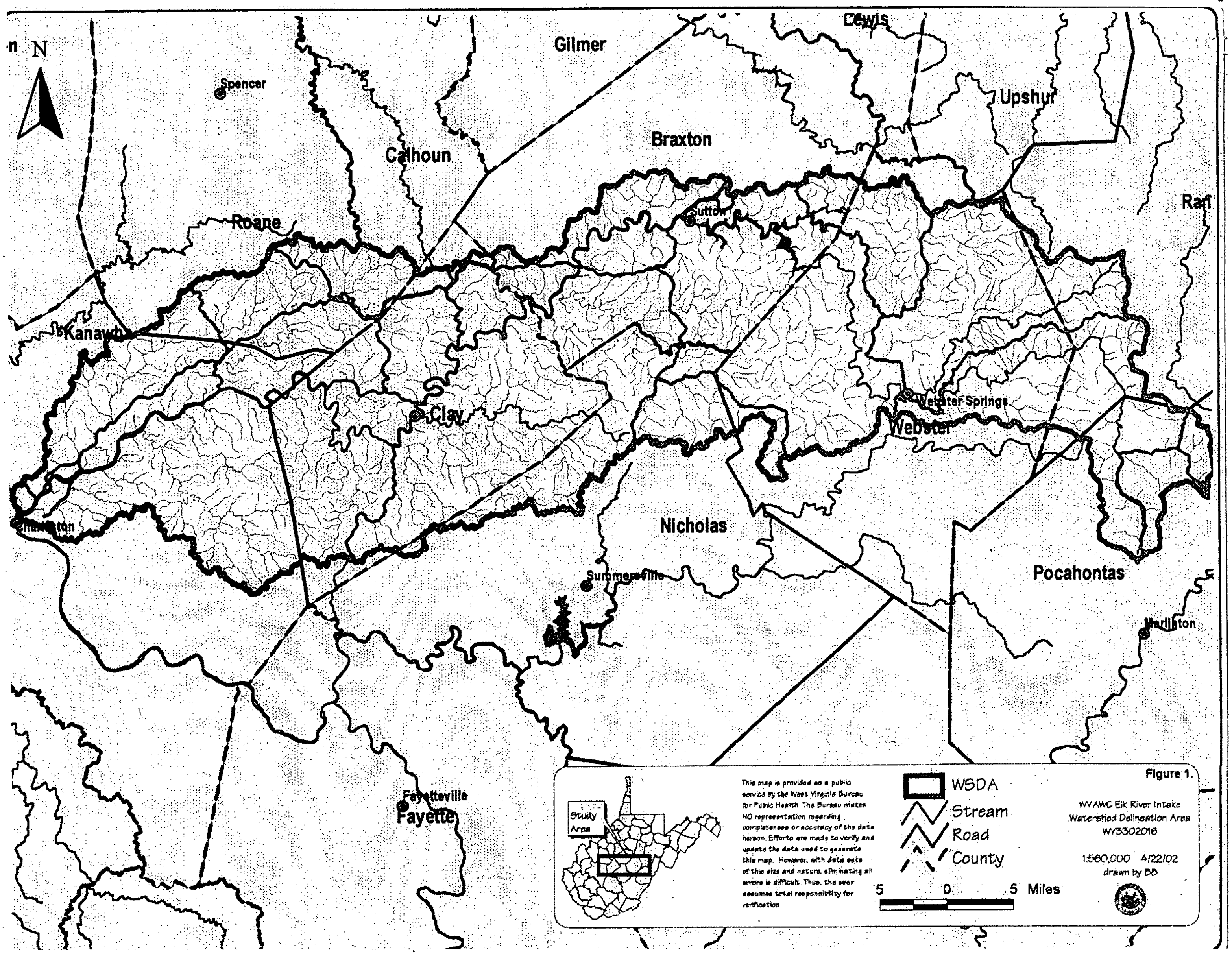
N
Spencer
Gilmer
Lewis
Upshur
Braxton
Calhoun
Roane
Sutton
Kanawha
Clay
Webster Springs
Webster
Nicholas
Summersville
Pocahontas
Marlinton
Fayetteville
Fayette
Study Area
This map is provided as a public service by the West Virginia Bureau for Public Health. The Bureau makes NO representation regarding completeness or accuracy of the data hereon. Efforts are made to verify and update the data used to generate this map. However, with data sets of this size and nature, eliminating all errors is difficult. Thus, the user assumes total responsibility for verification
WSDA
Stream
Road
County
5 0 5 Miles
Figure 1.
WVAWC Elk River Intake
Watershed Delineation Area
WV3302016
1:560,000 4/22/02
drawn by BB

WEST VIRGINIA
AMERICAN WATER

**Jeffrey L. McIntyre**
**President**
West Virginia American Water
1600 Pennsylvania Avenue
Charleston, WV 25302

January 21, 2014

The Honorable John D. Rockefeller IV
405 Capitol Street, Suite 508
Charleston, WV 25301

Dear Senator Rockefeller:

Thank you for your letter on January 17 about the Freedom Industries chemical spill and its subsequent impact on 300,000 West Virginians. I appreciate your concerns and join in your efforts to ease the burden on these families and reinstate their confidence in our drinking water.

As you know, the release of 7,500 gallons of MCHM by Freedom Industries on January 9 severely impacted our Kanawha Valley system customers. From the moment we learned of the Freedom Industries chemical spill, our first priority was the safety of these customers. Now that we have lifted the last "Do Not Use" order, as of January 17 at 12:50 pm, I am committed to working with you and your colleagues in Congress, the federal government, and the State of West Virginia to provide information, address concerns, and work together to protect the nation's tap water from chemical spills.

In your January 17 letter, you raised three questions; provided below are my answers:

*Are your tests showing that levels of crude 4-methylcyclohexane methanol (MCHM) are rising in certain areas?*

West Virginia American Water has taken a number of steps to provide water that is protective of human health and protect your constituents. We have conducted extensive testing of water samples taken from the impacted areas, including the river's raw water, finished water leaving the Kanawha Valley Water Treatment Plant, and multiple points across the distribution system. Of the samples taken to date, the results show that the MCHM levels are consistently declining, not rising.

*If so, what steps are you taking to protect the public from unsafe water?*

Levels in the river's raw water and the plant's treated water have been non-detectable since Monday evening, January 13. However, given the lack of information about MCHM, the U.S. Centers for Disease Control (CDC) is advising pregnant women to consider an alternative source of water. Specifically, we have shared the following message from the CDC with our customers, "At this time, scientists continue to recommend 1 ppm as a protective level to prevent adverse health effects. However, due to limited availability of data, and out of an abundance of caution,

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AMERICAN WATER

you may wish to consider an alternative drinking water source for pregnant women until the chemical is at non-detectable levels in the water distribution system."

*What steps are you taking to further eliminate crude MCHM from the water supply?*

West Virginia American Water and our interagency partners continue to flush and test water throughout the water distribution system. We will collect and test water samples at designated locations until test results show no detection of MCHM in parts per billion at all sample points throughout the water distribution system served by the Kanawha Valley Water Treatment Plant.

In addition to these answers, please find enclosed the brochure on "Our Next Steps," which contains more detailed information on sampling, testing, and future steps.

I would like to commend and thank the employees of West Virginia American Water who worked tirelessly with the National Guard, the West Virginia Bureau for Public Health and many other public servants and volunteers to restore access to drinking water.

Thank you for your leadership during the Freedom Industries chemical spill. I appreciate you taking immediate action to request an investigation into the chemical spill and your legislative efforts to hold responsible parties accountable. I am personally committed to working with you and every state and federal official to address ongoing concerns.

If you or your staff have additional questions, please do not hesitate to contact me or Laura Jordan, External Affairs Manager. I stand ready to meet with you at your convenience if you wish.

Sincerely,

Jeffrey L. McIntyre
President, West Virginia American Water

# OUR NEXT STEPS

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West Virginia American Water's vision is to be the trusted steward of your precious resource – water. We realize that, through no fault of our own, the public's trust in the water has been shaken. Nothing is more important to our team than to rebuild that trust with our customers and the community.

This experience has been extremely difficult for the people served by our Kanawha Valley Treatment Plant. We are going to get through it by working together, and we thank our customers for their patience and understanding. We will continue testing, monitoring and working with our interagency partners to restore your confidence in our drinking water. Already, we have made significant progress, with consistent test results showing the chemical has not been detected at our water treatment plant since January 13.

We are also very proud of how the employees of West Virginia American Water, along with the National Guard, the West Virginia Bureau for Public Health and local subject matter experts, responded to this crisis, working around the clock under very stressful conditions to tackle this monumental task. Thanks to their tireless effort and dedication, along with their expertise, approximately 300,000 people were able to resume use of their water. We are resolved to rebuild the customers' confidence and their trust in the quality of their drinking water.

As you can imagine this event has generated a high volume of calls and questions through our customer service center, email, and through social media. Although we are attempting to answer questions as we receive them, we have not been able to respond to all inquiries due to the sheer volume. We hope the following answers to some of the most frequently asked questions are helpful.

### Why does my water smell like licorice?

The water may still have an odor. Odors can be detected at levels far below the level that the Centers for Disease Control (CDC) determined is protective of public health. In fact, it has been indicated that the odor threshold is 100,000 times lower than the adverse effect level.

### What are your plans for long range sampling and testing?

West Virginia American Water and its interagency partners are focused on testing and sampling and conducting system maintenance until we have achieved a level of no detection at representative sample locations taken throughout the entire system served by the Kanawha Valley Treatment Plant.

(continued on page 2)

WEST VIRGINIA AMERICAN WATER

### What does non-detectable mean?

Any test result labeled "non-detectable" indicates that the result is below the analytical capability of the instrument and method used to measure it.

### How did you choose the sample points for the non-detect round of testing?

Sampling and flushing points were selected based on the predicted movement of water from zone to zone. The sample points represent entry point(s), middle point(s), and exit or dead-end point(s) within each zone. This provides for accurate monitoring/tracking for dispersion within each zone.

The sample points in general provide optimum test points to track the concentration levels as the water moves through the system from one pressure zone to another. This also establishes effective directional flushing, as the previous zone provides flushing water for the next successive zone. West Virginia American Water and the West Virginia Bureau for Public Health feel the selected sample points provide the best possible indicators for tracking/monitoring concentration levels throughout the entire system.

**For more information**
Please contact our 24-Hour Customer Service Center at 1-800-685-8660 or visit **westvirginiaamwater.com**.

### When does West Virginia American Water expect to reach the non-detectable level in its distribution system?

Customers should be reminded that all areas in the Kanawha Valley system have been cleared below the protective health limit of 1 ppm. At this time, we are not able to provide a timetable as we continue to conduct sampling throughout the distribution system to help us determine when we will reach non-detectable levels. The majority of samples collected to date are at the non detect level.

### What steps will West Virginia American Water be taking to reach non-detectable levels of MCHM, and will you be providing updates on your progress?

We will continue to perform sampling at the treatment plant and at multiple points across our distribution system. Samples from the Kanawha Valley Water Treatment Plant continue to be transported to laboratories in the state for analysis at the parts per billion level. Test results consistently show the levels of MCHM declining throughout the system serviced by the Kanawha Valley Treatment Plant.

In fact, the levels in the plant's raw water and finished water have been non-detectable since Monday evening, January 13. We will continue to work with our interagency partners to restore the customers' confidence in the quality of the water, and we will communicate our efforts to achieve non-detectable levels of MCHM across the system.

### Can you sample in my home?

We are not conducting nor do we plan to conduct in-home sampling. We are instead focused on continuing the sampling and flushing process throughout the system until all sample points are below the level of non-detection.

### How will I be notified when my area has achieved non-detect levels?

West Virginia American Water and its interagency partners will notify our customers after all sample locations served by the Kanawha Valley Treatment Plant report at the level of non-detection.

### Will you be changing the carbon in your treatment plant filters?

Activated carbon caps on our 16 filters are renewed or changed periodically as part of our normal operations. Regular backwashing, which cleans and flushes filters, is part of our plant's day-to-day procedures. Activated carbon is an enhanced form of treatment that provides an absorption capacity far greater than traditional filtering media. We plan to change the carbon in our filters when our treatment plant is operating at flows suitable for taking filters out of service. Changing out 60,000 pounds of activated carbon per filter is a physical process that typically takes 2-3 days each.

01-2014

Employee Education System

vaww.ees.lrn.va.gov

ID most vulnerable
- upstream facilities (storage, NPDES, etc.)
- monitoring stations
- chemicals - how to treat?

States - look at watershed prot efforts among programs

Infrastructure - operational capacity, storage
back up sources
emergency interconnects

Process for quickly eval chemicals -
how develop, confirm ATSDR values

Regional lab capabilities -
how quickly can we ramp up?

~~Water~~ PWS - ER plans - DNU, DND
review/update SWAs, SWPs } loss of water
States - visit SWA plans
- what's in watersheds

PROPYLENE GLYCOL PHENYL ETHER (PPh)

# WASHINGTON TOWNSHIP

# ENVIRONMENTAL COMMISSION

**P. O. Box 1106 523 Egg Harbor Road**

**Turnersville, New Jersey 08012**

**856/589.0520, Ext. 232**

**wtec@twp.washington.nj.us**

**(2nd Draft-To be Approved at August 1, 2013 Meeting)**

# Ex. 5 - Deliberative

# Ex. 5 - Deliberative

# Ex. 5 - Deliberative

113TH CONGRESS
2D SESSION

# S. ______

To protect surface water from contamination by chemical storage facilities, and for other purposes.

IN THE SENATE OF THE UNITED STATES

Mr. MANCHIN (for himself, Mrs. BOXER, and Mr. ROCKEFELLER) introduced the following bill; which was read twice and referred to the Committee on ______

# A BILL

To protect surface water from contamination by chemical storage facilities, and for other purposes.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,*

**SECTION 1. SHORT TITLE.**

This Act may be cited as the "Chemical Safety and Drinking Water Protection Act of 2014".

**SEC. 2. PROTECTION OF SURFACE WATER FROM CONTAMINATION BY CHEMICAL STORAGE FACILITIES.**

(a) IN GENERAL.—The Safe Drinking Water Act (42 U.S.C. 300f et seq.) is amended by adding at the end the following:

"PART G—PROTECTION OF SURFACE WATER FROM CONTAMINATION BY CHEMICAL STORAGE FACILITIES

"SEC. 1471. DEFINITIONS.

"In this part:

"(1) COVERED CHEMICAL STORAGE FACILITY.—

"(A) IN GENERAL.—The term 'covered chemical storage facility' means a facility at which a chemical is stored and the Administrator or State, as applicable, determines that a release of the chemical from the facility poses a risk of harm to a public water system.

"(B) EXCLUSIONS.—The term 'covered chemical storage facility' does not include a facility that is subject to a procedure, method, or other requirement for equipment to address hazardous substances pursuant to section 311(j)(1)(C) of the Federal Water Pollution Control Act (33 U.S.C. 1321(j)(1)(C)).

"(C) CONSIDERATIONS.—In determining risk of harm posed by a chemical storage facility under subparagraph (A), the Administrator or State, as applicable, may consider the requirements of applicable Federal or State laws (including regulations).

"(2) STATE PROGRAM.—The term 'State program' means a chemical storage facility source water protection program established under section 1472.

**"SEC. 1472. ESTABLISHMENT OF STATE PROGRAMS.**

"(a) IN GENERAL.—Not later than 1 year after the date of enactment of this part, the Administrator or each State exercising primary enforcement responsibility for public water systems, as applicable, shall carry out, directly or through delegation, a chemical storage facility source water protection program to provide for the protection of public water systems from a release of a chemical from a covered chemical storage facility.

"(b) PROGRAM REQUIREMENTS.—

"(1) IN GENERAL.—A State program under subsection (a) shall provide for oversight and inspection of each covered chemical storage facility in accordance with the requirements described in paragraph (2) to prevent the release of chemicals into the water supply in watersheds with public water systems that rely on surface water, including a covered chemical storage facility located in a source water area identified under section 1453.

"(2) MINIMUM REQUIREMENTS.—At a minimum, a State program shall include—

"(A) requirements for covered chemical storage facilities, including—

"(i) acceptable standards of good design, construction, or maintenance;

"(ii) leak detection;

"(iii) spill and overfill control;

"(iv) inventory control;

"(v) an emergency response and communication plan;

"(vi) an employee training and safety plan;

"(vii) an inspection of the integrity of each covered chemical storage facility;

"(viii) lifecycle maintenance, including corrosion protection;

"(ix) notice to the Administrator, the appropriate State agency, and applicable public water systems of—

"(I) the potential toxicity of the stored chemicals to humans and the environment; and

"(II) safeguards or other precautions that can be taken to detect, mitigate, or otherwise limit the adverse effects of a release of the stored chemicals; and

"(x) financial responsibility requirements, including proof of insurance, bond, or other similar instrument;

"(B) inspections of covered chemical storage facilities, which shall occur—

"(i) for a covered chemical storage facility identified in a source water assessment area under section 1453, not less frequently than once every 3 years; and

"(ii) for any other covered chemical storage facility, not less frequently than once every 5 years; and

"(C) a comprehensive inventory of the covered chemical storage facilities in each State.

"(c) NATIONAL PRIMARY DRINKING WATER REGULATIONS.—For purposes of primary enforcement responsibility, a State program and any requirements under this part shall be—

"(1) considered to be a part of the national primary drinking water regulations established under section 1412; and

"(2) implemented and enforced in accordance with the procedures under sections 1413 and 1414 and part E.

"(d) ADMINISTRATION.—A State program shall be carried out—

"(1) if the State exercises primary enforcement responsibility for public water systems in that State under this Act, by the State; and

"(2) if the State does not exercise primary enforcement responsibility for public water systems in that State under this Act, by the Administrator.

"(e) GUIDANCE.—The Administrator may issue guidance or provide other technical assistance to State programs in carrying out activities under this part.

**"SEC. 1473. CORRECTIVE ACTION ORDERS.**

"The Administrator under section 1472(d)(2) or the State under section 1472(d)(1), as applicable, may issue an order to the owner or operator of a covered chemical storage facility to carry out this part.

**"SEC. 1474. COST RECOVERY.**

"If costs have been incurred by the Administrator or the State, as applicable, for undertaking a response action under this part relating to the release of a chemical, the owner or operator of the covered chemical storage facility shall be liable to the Administrator or the State for those costs.

**"SEC. 1475. TRANSFER OF COVERED CHEMICAL STORAGE FACILITIES.**

"Notwithstanding the inspection schedule under section 1472(b)(2)(B), no person shall transfer a covered chemical storage facility unless—

"(1) prior to the closing or completion of the transfer, the transferor submits to the transferee the results of a pretransfer inspection of the integrity of the covered chemical storage facility, which shall be conducted pursuant to any requirements set by the Administrator under section 1472(d)(2) or the State under section 1472(d)(1), as applicable; and

"(2) the transferor or the transferee agrees to take appropriate measures to address the results of the pretransfer inspection prior to the date that is 30 days after the date on which the covered chemical storage facility closes or is transferred.

**"SEC. 1476. INFORMATION SHARING.**

"(a) INFORMATION FOR PUBLIC WATER SYSTEMS.—The Administrator or State, as applicable, shall provide public water systems with information relating to—

"(1) emergency response plans for covered chemical storage facilities located within the same watershed as the public water system; and

"(2) an inventory of each chemical held at the covered chemical storage facilities described in paragraph (1).

"(b) EMERGENCY RESPONSE PLANS.—A copy of each emergency response plan submitted under section 1472(b)(2)(A) shall be provided to—

"(1) the Administrator (if the State exercises primary responsibility for public water systems in that State); and

"(2) the Secretary of Homeland Security.

"(c) INFORMATION.—

"(1) IN GENERAL.—The Administrator or a State, as applicable, may keep confidential information the Administrator or the State determines to be sensitive and present a security risk to a covered chemical storage facility.

"(2) EXCEPTIONS.—Paragraph (1) shall not—

"(A) apply to public health information; or

"(B) prevent the sharing of information with the Administrator, the Secretary of Homeland Security, a public water system, or a public agency involved in emergency response.".

(b) EMERGENCY POWERS.—Section 1431 of the Safe Drinking Water Act (42 U.S.C. 300i) is amended—

(1) by redesignating subsection (b) as subsection (c); and

(2) by inserting after subsection (a) the following:

"(b) PETITIONS.—

"(1) IN GENERAL.—In any case in which the Administrator is authorized to act under subsection (a), the owner or operator of a public water system may—

"(A) commence a civil action for appropriate equitable relief, including a restraining order or permanent or temporary injunction, to address any activity or facility that may present an imminent and substantial endangerment to the health of persons who are supplied by that public water system; or

"(B) petition the Administrator to issue an order or commence a civil action under subsection (a).

"(2) RESPONSE.—

"(A) IN GENERAL.—Subject to subparagraph (B), not later than 30 days after the date on which the Administrator receives a petition under paragraph (1), the Administrator shall respond to the petition and initiate such action as the Administrator determines to be appropriate.

"(B) SPECIAL RULE FOR EMERGENCIES.—If the owner or operator of a public water system submits the petition under paragraph (1) in response to an emergency, the Administrator shall respond not later than 72 hours after receipt of the petition.".

(c) CONFORMING AMENDMENT.—Section 1414 of the Safe Drinking Water Act (42 U.S.C. 300g–3) is amended—

(1) in subsections (a), (b), (e), (f), and (g)—

(A) by inserting after "public water system" each place it appears "or a covered chemical storage facility"; and

(B) by inserting after "public water systems" each place it appears "or a covered chemical storage facility"; and

(2) in subsection (i)—

(A) by redesignating paragraphs (1) through (3) as subparagraphs (A) through (C), respectively, and indenting appropriately;

(B) by striking the heading designation and all that follows through "means—"and inserting the following:

"(i) DEFINITIONS.—In this section:

"(1) APPLICABLE REQUIREMENT.—The term 'applicable requirement' means—";

(C) in paragraph (1)(A) (as so redesignated)—

(i) by inserting a comma after "1417"; and

(ii) by striking "or 1445" and inserting "1445, or part G"; and

(D) by adding at the end the following:

"(2) COVERED CHEMICAL STORAGE FACILITY.—The term 'covered chemical storage facility' has the meaning given the term in section 1471.".

Ex. 5 - Deliberative

caramelized onions, bacon, and a sprinkling of both Gruyère and farmer's cheese. Repeat layers to use remaining ingredients. Finish with dough on top, followed by Gruyère and farmer's cheese. Season top with pepper.

7. Cook until lasagna is bubbly and cheese on top is golden brown, about 40 minutes. Let rest 15 to 20 minutes and then serve with a dollop of sour cream and a sprinkle of chives.

**KITCHEN COUNTER**

Serves 10-12.


http://parade.condenast.com/255679/michaelsymon/pierogi-lasagna/

# Ex. 5 - Deliberative

Sustainable Jersey

Following the Environmental Commission's presentation before Council in March, Council members voted to have Washington Township participate in the Sustainable Jersey program at their July meeting. The Environmental Commission and the Open Space Advisory Committee will take the lead in setting up the program. Vicky Binetti and Leon Lakitz plan to meet with Mayor Wallace to discuss forming the Green Team comprised of representatives of diverse groups within the Township whose job will be to spearhead actions under the program.

ANJEC Grant Application

The Commission was awarded a $780 grant from ANJEC to be used to improve and mark trails, label trees and prepare a trail guide for Washington Lake Park. Due to the rainy weather, progress has slowed. Leon Lakritz mentioned that at a rain garden in Scotland Run Park large rocks are painted with the names of the plants for identification. A similar approach could be used to label plants, trees and environmental features on our trails; this might be a Scout project. He will also contact the South Jersey Land & Water Trust for their assistance in identifying noteworthy environmental elements on the trails.

E&R Day Care

E&R Day Care Center is located on Mt. Pleasant Avenue. The Environmental Commission's main concern with this application, when reviewed two years ago, is that it is adjacent to a salvage yard, and [illegible] appears to run towards the day care center. They have revised their plans, but to

# Ex. 5 - Deliberative

Ex. 5 - Deliberative

# Ex. 5 - Deliberative

# Ex. 5 - Deliberative

# Ex. 5 - Deliberative

WV TAP
WEST VIRGINIA TESTING ASSESSMENT PROJECT

# The Crude MCHM Chemical Spill 10-Home Study: Resident Behaviors, Perceptions, and Residence Characteristics

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## 1.0 Introduction and Methods

As part of the WV TAP project Task 3, ten households affected by the crude MCHM that was spilled into the Elk River and contaminated the Charleston, WV region's drinking water were surveyed and sampled. This report presents results of interviews that were conducted as a part of the 10-home study to elicit data on water customer perceptions and activities following the chemical spill. Water quality data collected during the 10-house study are presented in a companion report.

Households were surveyed and sampled in eight (Boone, Cabell, Clay, Kanawha, Lincoln, Logan, Putnam, and Roane) of the nine counties affected by the chemical spill. Homes were visited between February 11, 2014 to February 18, 2014. No affected homes in Jackson County were visited because the Jackson County residents contacted declined participation and switched to private well water in response to the contamination incident. Jackson County had the lowest number of West Virginia American Water (WVAW) customers of the nine counties affected. A second home in Putnam County near the Jackson County line was visited in lieu of visiting a residence in Jackson County.

During each household visit, three tasks were completed:

1. Residents were interviewed by the WV TAP project team;
2. Basic chemical and physical properties (temperature, pH, chlorine residual) were determined for tap water from kitchen faucets and bathroom fixtures; and
3. Water samples were collected for detailed analyses at commercial laboratories.

Resident interviews were conducted using the questionnaire found in Appendix A of this report. Project team members completed the questionnaire while speaking with a household representative. Not all residents responded to all questions. Results shown in this document note the number of respondents for each question.

## 2.0 Interview Results

### *2.1 Demographics and Notification*

The survey of the 10 homes revealed an average of 3.3 people (range from 2 to 7) in each house and the age range of the person responding to the survey was 23 to 65 years old. Children, people older than 70 years of age, or individuals who may be immunocompromised lived in two of the 10 households. All of the households learned about the 'Do Not Use' Order on January 9, 2014, the date the order was issued.

Most of the household representatives first learned about the 'Do Not Use' Order through discussions with friends and family members (**Table 1**). The next most common method was television broadcast. Radio, Facebook, and phone alerts were less frequently cited.

**Table 1. Communication Method Households First Learned about the 'Do Not Use' Order**

| Mode of Communication | Number of Households Responding |
|---|---|
| Word of Mouth | 4 |
| TV | 3 |
| Radio | 1 |
| Facebook | 1 |
| Phone Alert | 1 |

Representatives from all 10 households responded to this question.

*2.2 Residential Property Service Line, Plumbing System, Water Treatment, and Storage Characteristics*

During house visits plumbing system components were inspected. Premise plumbing in the 10 homes was comprised of a wide range of materials (**Table 2**). Several homes visited had undergone plumbing renovations between 1986 and 2013. Of the 10 homes visited, in-home plumbing was reported to be copper pipe (5), plastic pipe (4) and a combination of plastic and copper pipe (1). None of the homes had point of entry supplemental water treatment systems. Two homes had a refrigerator water filter installed. Residents of one home stored tap water in a container in the refrigerator or on a shelf. Another household used a point-of-use filter to treat their tap water before drinking. Nine of 10 homes had electric hot water heaters and water heaters were typically nine years old with an age range of 3 to 16 years.

**Table 2. Type of Plumbing System Materials Installed in Each Home**

| Characteristic Identified | Number of Households Responding |
|---|---|
| Single type of plumbing pipe | 6 |
| Mixed plumbing pipe system | 4 |
| Contained some plastic pipe | 8 |
| Contained some copper pipe | 6 |
| Electric hot water heater | 9 |
| Gas hot water heater | 1 |
| Refrigerator water filter | 2 |

Representatives from all 10 households responded to each question; plumbing systems that contained plastic pipe included cross-linked polyethylene (PEX), polybutylene (PB), and chlorinated polyvinylchloride (cPVC) pipe materials.

*2.3 Tap Water Odor, Taste, and Color Reports*

Resident behavior and perceptions were elicited through a series of before incident / after incident questions. A tap water odor was reported by residents in nine of the 10 homes before, during, or following the January 9 "Do Not Use" Order (**Table 3**). Only three persons reported an unusual tap water color in their homes (**Table 4**). One person tasted the contaminated tap water and said the water had a sweet taste. None of the other people in the homes drank the contaminated tap water once the "Do Not Use" Order was issued (**Table 5**).

**Table 3. Date Households Detected the Odor in their Tap Water**

| Date | Number of Households Responding | Odor Level |
|---|---|---|
| Odor never detected | 1 | - |
| 6-Jan | 1 | 3 |
| 9-Jan ('Do Not Use' Order issued) | 3 | 3,4,4 |
| 10-Jan | 1 | 5 |
| 11-Jan | 1 | 4 |
| 12-Jan | 1 | 5 |
| 13-Jan | 1 | 4 |
| 14-Jan | 1 | 4 |

Representatives from all 10 households responded to this question; Odor ratings: 1 no odor, 2 slight, 3 moderate, 4 strong, 5 unbearable.

**Table 4. Date Households Detected Unusual Color in their Tap Water**

| Date | Number of Households Responding | Color Rating | Comments |
|---|---|---|---|
| Color never detected | 7 | - | - |
| 14-Jan | 1 | 2 | - |
| 30-Jan | 1 | 3 | - |
| 8-Feb | 1 | NR | Oily film on water in sink |

Representatives from all 10 households responded to this question; Color ratings: 1 clear, 2 slight, 3 moderate, 4 dark, 5 very dark.

**Table 5. Date Households Detected the Unusual Taste in their Tap Water**

| Date | Number of Households Responding | Taste Rating | Comments |
|---|---|---|---|
| Did not taste the water | 9 | - | - |
| Date not reported | 1 | Not reported | Sweet |

Representatives from all 10 households responded to this question; Taste ratings: 1 no taste, 2 slight, 3 moderate, 4 strong, 5 unbearable.

### *2.4 Plumbing System Flushing and Reported Symptoms*

On average, residents flushed their plumbing systems 14 days after the January 9 'Do Not Use' Order was issued following the guidance provided by WVAW (Appendix B). Some residents flushed within 4 days of the incident while other residents waited 37 days. The most frequently reported symptoms encountered during flushing were rashes, dizziness, and eye burning). As of the date of the survey, four of the 10 persons had spoken with a doctor since the incident occurred about the medical implications of exposure. Of the 10 homes, outside individuals visited four of those homes during and following the incident, but none were exposed to tap water because those homes were restricting exposure to tap water in response to the contamination incident.

**Table 6. Symptoms Reported by Each Household Following Tap Water Exposure**

| Symptom | Number of Households Responding | Ratings |
|---|---|---|
| Rash | 4 | 3,4,5,5 |
| Dizziness | 4 | 3,3,3,5 |
| Burning | 4 | 3,3,3,4 |
| Nausea | 3 | 2,3,3 |
| Numbness | 2 | 2,3 |
| Memory loss | 2 | 4,4 |
| Vomiting | 1 | 2 |
| Other: Headache | 3 | No rating |
| Other: Flu-like symptoms | 1 | No rating |
| Other: Agitated | 1 | No rating |
| Other: Skin itch | 1 | No rating |
| Other: Eyes red | 1 | No rating |

Representatives from all 10 households responded to each question; Ratings: 1 no effect; 2 slightly different, 3 moderately differently, 4 very different, 5 severely different.

*2.5 Level of Tap Water Contact*

As of the interviews, residents had not resumed their pre-spill water use activities. While all persons used tap water for flushing toilets before and after the incident, one person chose not to use tap water for laundry purposes. At the time of the survey, four households were not using tap water for showering and nine were not using it for brushing teeth; none were using it for drinking, cooking, or baby formula. One household had resumed using hot tap water for mixing hog feed.

**Table 7. Level of Contact with the Water before the Incident and as of the Survey Date**

| Tap Water Use | Total Responding | Number of Households Responding | |
|---|---|---|---|
| | | Before | After |
| Drink | 10 | 5 | 0 |
| Shower | 10 | 10 | 6 |
| Laundry | 10 | 10 | 9 |
| Flush toilets | 10 | 10 | 10 |
| Brush teeth | 9 | 8 | 1 |
| Cook | 7 | 7 | 0 |
| Animals | 6 | 3 | 1 |
| Baby formula | 1 | 1 | 0 |

Representatives from 1 to 10 households responded to each question.

*2.6 Resident Attitudes Toward Organizations and Comments*

To ascertain resident opinions about the incident and organizations involved, a series of questions were asked regarding what organization they felt was the most responsible for causing the incident and their attitudes towards various agencies. Half of the persons surveyed felt that a West Virginia State Government Agency was most responsible, while some named Freedom Industries and WVAW (**Table 8**). Some respondents felt two organizations were equally responsible but were asked to select one. In the five instances when two agencies were named, four out of five believed WVAW bore some responsibility.

**Table 8. Organization Most Responsible for the Problems of the Incident**

| Organization | Number of Households Responding |
|---|---|
| West Virginia Government Agency | 5 |
| Freedom Industries | 4 |
| West Virginia American Water | 1 |

Representatives from all 10 households responded to each question.

Discussions with homeowners generally revealed residents had reduced confidence in the US Centers for Disease Control and Prevention (CDC), US Environmental Protection Agency (EPA), and State Agencies. Confidence in WVAW was eroded as well. Interestingly, residents attributed more confidence to outside consultants than any other organization.

**Table 9. Level of Confidence in Organizations before the Incident and as of the Survey Date**

| Organization Type | Name | Confidence Rating | |
|---|---|---|---|
| | | Before | After |
| Federal Government | CDC | 4.2 ± 1.5 (7) | 2.3 ± 1.2 (9) |
| | EPA | 3.5 ± 1.8 (8) | 2.1 ± 1.3 (10) |
| | White House | 3.0 ± 1.7 (6) | 2.8 ± 2.0 (6) |
| Water Utility | West Virginia American Water | 4.0 ± 1.4 (8) | 1.6 ± 1.3 (10) |
| State Government | State Health Department | 3.6 ± 1.5 (7) | 1.8 ± 1.0 (9) |
| | County Health Department | 3.5 ± 1.9 (4) | 3.1 ± 2.0 (7) |
| | Governor's Office | 2.9 ± 1.4 (9) | 1.7 ± 0.9 (9) |
| | West Virginia DEP | 2.6 ± 1.9 (9) | 1.7 ± 1.3 (10) |
| Nongovernmental | Outside Consultants | 4.3 ± 1.6 (6) | 4.7 ± 0.8 (7) |

Representatives from 6 to 10 households responded to each question; Ratings represent 5 = High confidence and 1 = Low confidence; Mean and standard deviation values shown for (n) persons responding.

In addition to the posed survey questions, the interviewer captured comments made by the residents about the spill and its aftermath. These comments are paraphrased and summarized in **Table 10**.

**Table 10. Comments by Residents**

| Home | Resident Comments |
|---|---|
| 1 | County was not in first official notification; resident called WVAW and was told incorrectly they were not in the affected area. Had to call for bottled water, feels County was forgotten. No confidence in Bureau of Public Health. Did not have confidence in the County Health Department in the beginning as they relied on WVAW and others in saying the water was safe, but then changed position and made independent comments, gained respect. State should have been checking chemical tanks all along. Wrote to the White House, 60 Minutes, Rachel Maddow and local weatherman; no response initially from anyone but Maddow then gave some coverage. Government handled the situation horribly and relied too much on WVAW and they knew the water wasn't safe. Government screwed up and said water was safe so no FEMA emergency money is available. No confidence in Obama administration, not mentioned in State of the Union address. Feels like this is the 1800s or Third World. West Virginia has been ignored. |
| 2 | Baby boy 8 months old went to the emergency room for throat rash as he was very hoarse. Water was brown when flushed on Jan 30. |
| 3 | City did not use emergency alarm system; felt City should have done so as that is what it is for. Female resident got nosebleed walking to work along the Elk River on the morning of January 9. Residents are long-term users of ceramic filter for all water ingested. Did taste some water at a restaurant on January 9 around 4:30 pm before 'Do Not Use' Order and thought it tasted off so they did not drink it, thought the Coke lines and water lines were mixed in the drink machine. Felt disoriented and left town for the weekend after the event occurred and shut off the water to the house. The smell from the water still comes and goes when running taps. High regard for Kanawha County Health Department. Feels State is responsible for spill as it is their role to regulate industry and keep people safe. |
| 4 | Resident flushed the house on January 18. Smelled sweet odor 3 to 4 days before January 9; headaches during flushing. Washed berries in tap water prior to January 9 and felt sick after eating them. Favorable opinion of Kanawha County Health Department. |
| 5 | Opinion of Kanawha County Health Department improved as the event progressed. |
| 6 | Smelled sweet odor in water 3 weeks prior to January 9; was licorice odor, now is lighter and sweet. After showering skin felt soft and silky like lotion that was not completely washed off. WVAW should have alarm system to detect when river water is contaminated; strong smell at first flush of taps each day. "No one in politics is doing anything". |
| 7 | Homeowner worked with MCHM in 1980's and remembers the smell in the water as that same smell. Odor began on the third day, was unbearable. Did not shower or wash clothes for first two weeks after spill as clothes smelled of licorice. "Politics rules everything", would have preferred to receive call directly, not hear from news reports. Favorable opinion of Kanawha County Health Department. |
| 8 | District water agency that supplies WVAW was excellent, provided lots of information. Resident said that water is not piped from WVAW but a tank is filled periodically from a truck. Thought they were spared as it took five days before smell occurred in their water. |
| 9 | Use tub hot water tap to mix hog feed in the morning; still have odor in water on first flush. |
| 10 | Felt faint after showering after flushing, lungs felt tight, wife had chemical burns after shower. House at end of system and had no odor until Jan 13, thought they had avoided contamination. |

## 3.0 FINDINGS

Interviews with representatives of the 10 households affected by the tap water contamination incident revealed several key findings:

1. The majority of the residents learned about the 'Do Not Use' Order by word of mouth (4 of 10 homes) and television broadcasts (3 of 10 homes), followed by Facebook, radio, and phone alert. All of the residents that were interviewed had heard about the 'Do Not Use' Order on January 9.
2. Homes had a variety of plumbing materials including copper and a variety of plastics; nine of 10 homes had electric hot water heaters.
3. None of the homes had whole house water filters (point of entry water treatment), and only one had a treatment system after the tap. Two homes had refrigerator water filters.
4. Residents in one of the 10 homes never detected any odor in the water. The other nine homes reported moderate to unbearable odor at some point on or after January 9.
5. Three of the 10 homes noted some color change in their water. These color changes might have been a result of system flushing.
6. Nine of the 10 homes reported not tasting the water once the 'Do Not Use' Order was issued; in the home where one resident did drink the water he reported it as sweet tasting.
7. All residents flushed their plumbing, on average 14 days after the 'Do Not Use' Order was issued. One resident first flushed his system 37 days after the incident. Seven of the 10 respondents reported rashes or burning eyes associated with flushing.
8. All homes used water for toilet flushing before and throughout the event. At the time of the interviews four homes were not using water for showering and nine were not using tap water for teeth brushing. None were using tap water for drinking, cooking, or making baby formula; only one home used tap water for watering farm animals.
9. Prior to the contamination event, half of the households did not use tap water for drinking. Two of 10 did not use tap water for brushing teeth and three of 10 did not use tap water for cooking.
10. Half of the respondents felt that a West Virginia Government Agency was responsible for the contamination event for lack of oversight of industry. When more than one responsible party was named, WVAW was named in four instances.
11. Where households had an opinion of a particular agency prior to the spill, they generally reported a lack of confidence in that agency after the spill. Kanawha County Health Department was named specifically by half of the respondents as an agency in which they had confidence. Outside consultants were also identified as holding resident confidence.

# APPENDIX A. Ten Home Study Questionnaire

# WV TAP

WEST VIRGINIA TESTING ASSESSMENT PROJECT

**CONSENT FORM FOR PARTICIPATION IN WATER ANALYSIS**

**RELATED TO THE MCHM SPILL**

Corona Environmental Consulting, LLC has been contracted by the State of West Virginia to undertake a study of homes in Charleston, WV to assess presence and levels of 4-Methylcyclohexanemethanol or MCHM that may be present in tap water in homes. This study includes sampling domestic water within the home and interviewing household members. Observation of obvious plumbing in the homes will be noted.

Corona scientists are working with Dr. Andrew Whelton from the U. of South Alabama who has been involved in the incident from the earliest stages. The goal of this sampling and testing is to determine if MCHM as well as other chemicals that may be present in the water and at what levels.

Corona Environmental has contracted with two independent certified drinking water laboratories to conduct these analyses. Corona Environmental will collect the samples and ship them to the contracted labs. Corona samplers will conduct a brief interview with homeowners and/or those living in the home to understand: the water usage pattern prior to the event, water quality changes if any noted by persons living in the homes, and a short survey on household plumbing. **Homeowner/resident names in this study will be kept confidential.** By signing this consent form the homeowner releases the State of West Virginia, the Contractor, and its agents from liability.

Address: ______________________________________________

Signature of homeowner: ______________________________________

Signature of interviewer: ______________________________________

**WV TAP**
WEST VIRGINIA TESTING ASSESSMENT PROJECT

**West Virginia Drinking Water Survey Questionnaire**

1. Name of person(s) interviewed:
2. Address:
3. Phone: email:
4. Number of people living in the household (ages, sex):

5. When did you find out about the drinking water being contaminated?

_______________________________________________

6. Where did you hear about the incident first?
   a. TV b. Newspaper c. Radio d. Word of mouth
   e. Other:______________
7. Do household members regularly drink tap water? If no, do residents drink bottled water or use home water treatment devices (describe)?

**Aesthetic**

8. When did you first notice the water odor and describe the types? Has the odor(s) changed?

_______________________________________________

   a. Rate the strength of the water odor from 1-5
   (1 no odor, 2 slight, 3 moderate, 4 strong, 5 unbearable)

| | | | | | |
|---|---|---|---|---|---|
| DAY:________________ | 1 | 2 | 3 | 4 | 5 |
| DAY:________________ | 1 | 2 | 3 | 4 | 5 |
| DAY:________________ | 1 | 2 | 3 | 4 | 5 |
| DAY:________________ | 1 | 2 | 3 | 4 | 5 |

9. Did you notice any coloration in your water? Has the color changed?

_______________________________________________

   Rate the intensity of the color from 1-5 (1 clear, 2 slight, 3 moderate, 4 dark, 5 very dark)

| | | | | | |
|---|---|---|---|---|---|
| DAY:________________ | 1 | 2 | 3 | 4 | 5 |
| DAY:________________ | 1 | 2 | 3 | 4 | 5 |
| DAY:________________ | 1 | 2 | 3 | 4 | 5 |
| DAY:________________ | 1 | 2 | 3 | 4 | 5 |

If you noticed any changes in taste, when did first occur? Has the taste changed?

_______________________________________________

Rate the strength of the taste from 1-5 (1 no taste, 2 slight, 3 moderate, 4 strong, 5 unbearable)

| | | | | | |
|---|---|---|---|---|---|
| DAY:________________ | 1 | 2 | 3 | 4 | 5 |
| DAY:________________ | 1 | 2 | 3 | 4 | 5 |
| DAY:________________ | 1 | 2 | 3 | 4 | 5 |
| DAY:________________ | 1 | 2 | 3 | 4 | 5 |

10. Do you have any children, people older than70 years of age, or individuals who may be immunocompromised in the household:________

11. Describe your level of contact with the water before the incident? After the incident?
    a. Drinking: ______________________________
    b. Showering/bathing: ______________________
    c. Washing clothes: ________________________
    d. Brushing teeth: _________________________
    e. Cooking: ______________________________
    f. Watering animals: _______________________
    g. *Making baby formula:* ____________________
    h. Flushing toilets:_____________________________

12. Have you felt differently after contacting the water?_______Yes/No_______
    (1 No affect; 2 slightly different, 3 moderately differently; 4 very different, 5 severely different)

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| i. | Nausea: | 1 | 2 | 3 | 4 | 5 | | | |
| j. | Vomiting: | 1 | 2 | 3 | 4 | 5 | | | |
| k. | Diarrhea: | 1 | 2 | 3 | 4 | 5 | | | |
| l. | Dizziness: | 1 | 2 | 3 | 4 | 5 | | | |
| m. | Rash: | 1 | 2 | 3 | 4 | 5 | | | |
| n. | Numbness: | 1 | 2 | 3 | 4 | 5 | | | |
| o. | Memory loss: | 1 | 2 | 3 | 4 | 5 | | | |
| p. | Other: ________________________ | | | | 1 | 2 | 3 | 4 | 5 |

______________________________________________________________________________

_____________________________________________________________________

13. Number of people (sex, age) visiting the household during the event if known:
14. Length of visit(s) if known.
15. What did visitors experience, if anything from air or water exposure?
16. Who/what organization do you feel is most responsible for the problems this incident?
17. Have you talked with your/a medical doctor since the event occurred? Yes/No

**Information on Premise Plumbing**

18. What type of pipe is installed in your –DRINKING WATER– plumbing system?
    a. Copper
    b. PEX
    c. cPVC
    d. PVC
    e. Other:____________________________________________

19. When was your plumbing system installed or last renovated?
    ______________________________________________________

20. Have you flushed out your entire house, if so when? Date/
    Time______________________________

**Observations of Interviewer**

Entrance of piping/material from meter into the house:

Is water treated after it leaves the service meter?

Whole house filter: Pitcher filter:

Fridge filter: Stored in container in fridge or on shelf

Materials noted in premise plumbing by interviewer:

Hot water heater: Type (electric, gas) Operation (on demand, continuous, intermittent)

Piping material in and out of heater:

Age of heater (if known):

Kitchen faucet: Separate cold and hot or blended, aerator, treatment device (ask homeowner to remove)

Level of confidence in agency before and after incident: Rate 5 high -1 low
CDC
USEPA
STATE DEP
STATE HEALTH DEPT
COUNTY HEALTH DEPT
WV AW
GOVERNOR'S OFFICE
WHITE HOUSE
OUTSIDE CONSULTANTS

# APPENDIX B. WVAW Flushing Guidance

# WV TAP

WEST VIRGINIA TESTING ASSESSMENT PROJECT

## HOW TO FLUSH YOUR PLUMBING SYSTEM

WEST VIRGINIA AMERICAN WATER

Following are step-by-step procedures customers can use to flush their plumbing system. To protect the health and safety of our communities, we recommend that you read carefully and follow the steps for flushing. Thank you for your cooperation. **NOTE: After flushing, your water filters need to be replaced. If you have any point of entry water treatment system such as a water softener or filter, please refer to "How to Flush Plumbing Appliances and Faucets."**

West Virginia American Water will be offering residential customers a credit of 1000 gallons, which is more than what will likely be required to flush the average residential home. The average residential customer uses approximately 3,300 gallons per month.

### How to flush your plumbing system

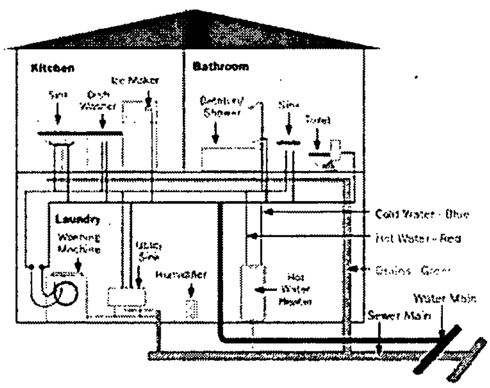
**Please complete these steps in the order set out below. Finish each step completely before moving on to the next step.**

1. Flush ALL hot water taps for 15 minutes
   Begin the flushing procedure by opening the hot water taps in your bathroom(s). Open ALL hot water lavatory (sink) fixtures, hot water bath fixtures, and any other hot water fixtures, such as kitchens, wet bars, etc. **Run these hot water fixtures for at least 15 minutes. Shut water off after 15 minutes.** After you have flushed each hot water faucet for 15 minutes, your hot water heater will be safe for use.

2. Flush ALL cold water taps for five minutes
   Once the hot water tank and hot water piping have been flushed, open ALL of the cold water fixtures, flush each toilet at least one time. **Run these cold water fixtures for at least five minutes. Shut water off after five minutes.** This does include the water in your refrigerator water dispenser.

3. Flush ALL remaining faucets and appliances
   (Before starting step 3, please see **How to Flush Plumbing Appliances and Faucets** for more information.) Open any remaining fixtures such as hose bibs, external faucets or fixtures not used for drinking for at least five minutes to finish the plumbing system flushing. Take additional steps to remove water from other appliances. See **How to Flush Plumbing Appliances and Faucets** for more information. This includes:

- Ice makers
- Dishwashers
- Washing machine
- Humidifiers
- Continuous Positive Airway Pressure (CPAP)
- Oral, medical or health care devices
- Baby formula, food and drinks made with water during DO NOT USE
- Water filters
- Water softeners
- Reverse osmosis units




**Any lingering smell, which is expected, is not a health issue.**

For more information: Please contact our 24-Hour Customer Service Center at 1-800-685-8660 or visit our website at **www.westvirginiaamwater.com**.

# WV TAP

WEST VIRGINIA TESTING ASSESSMENT PROJECT

# HOW TO FLUSH PLUMBING APPLIANCES AND FAUCETS

WEST VIRGINIA AMERICAN WATER

Once you've flushed your hot and cold water faucets, be sure to take these additional steps to flush plumbing appliances. To protect the health and safety of our communities, we recommend that you read carefully and follow the steps for flushing. Thank you for your cooperation.

- Ice makers
  If you have an ice maker in your refrigerator, first throw away all ice and then:

  **If you have a filter on your ice maker:** Some refrigerators, which have ice makers, also have filters on the small water line that feed the ice maker. If you have or use filters on your ice maker, you want to replace the filter **AFTER** flushing your refrigerator's ice maker. These filters require routine replacement. This would be a good time to replace the filter to ensure that the water line to the ice maker is completely flushed. Some refrigerators also provide filtered cold water. Check to make sure that you have replaced any filter **AFTER** flushing that is associated with the cold water supply. Then flush cold-water dispenser for five minutes.
- After flushing all of the other plumbing, let the ice maker container fill up completely and discard this ice and clean the container before replacing. If you have more than one refrigerator make sure you perform the same procedure on those units as well.
- Dishwashers and washing machines-
  Dishes and clothes that were washed during the DO NOT USE order should be rewashed. After flushing hot water pipes and water heater, run dishwasher and washing machine empty one time.
- Humidifiers, CPAP and other devices
  Throw away any water used in humidifiers, Continuous Positive Airway Pressure (CPAP), oral, medical or healthcare devices, and rinse the device with clean water.
- Baby formula, food or drinks made with water during the DO NOT USE
  Be sure you have thrown away any baby formula or other foods prepared with water on the days of the DO NOT USE. This includes drinks like Gatorade made with powder or concentrate.
- Water filters
  Clean or change your water filter, or contact the filter manufacturer for more details.
- Water supplies for pets
  Pets need clean water too. Be sure to empty all water bowls, bottles, or other water supplies for your pet. After flushing your water system, wash the pet bowl, bottle or other water supply. Then refill with tap water.
- Point of entry/point of use devices (this may not apply to all customers)
  If you have a Point of Entry water treatment system such as a water softener or filter, which all of the home's water passes through before it enters the main plumbing system, you should consider the following general guidelines before completing your household plumbing flushing.

*(Continued on page 3)*

For more information
Please contact our 24-Hour Customer Service Center at 1-800-685-8660 or visit **www.westvirginiaamwater.com.**

# WV TAP

WEST VIRGINIA TESTING ASSESSMENT PROJECT

## HOW TO FLUSH PLUMBING APPLIANCES AND FAUCETS

WEST VIRGINIA AMERICAN WATER

- **Water softeners:** Household water softener, which uses a natural or synthetic resin material to exchange sodium for calcium and magnesium present in the water, should be manually regenerated before flushing your plumbing system. This will ensure that the softener resin has been backwashed and cleaned before flushing procedures begin. If you are unsure of how to manually initiate a regeneration cycle, refer to your softener owner's manual or call you equipment supplier for assistance.
- **Sediment Filters:** Household water filters usually fall in two basic categories:
  - Pressure filters, which can be backwashed to clean
  - Cartridge filters, which have a replaceable element or cartridge

  If your home has a pressure filter that can be backwashed, you should initiate a manual backwash of the filter before proceeding with, and after completing, the flushing procedures. If you have a whole house cartridge filter system, you should replace the cartridges after completing the flushing procedures.
- **Point of use filters/treatment:** If you have or use Point of Use filters, which are typically attached to your kitchen faucet you should replace the filter before using the faucet-connected unit. These filters require periodic replacement anyway so this would be a good time to do this.
- **Reverse Osmosis:** Reverse Osmosis drinking water treatment systems often have pre-filters, which you may want to replace before flushing the RO System. However the actual Reverse Osmosis membrane module should not require replacement. If the manufacturer of the membrane suggests that you replace this part of the system you should ask them to give you the specific reasons why.

**For more information**

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WV TAP

WEST VIRGINIA TESTING ASSESSMENT PROJECT

# The Crude MCHM Chemical Spill 10-Home Study: Tap Water Chemical Analysis

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**May 5, 2014**

## 1.0 Introduction

As part of the WV TAP project Task 3, ten households affected by the crude MCHM that was spilled into the Elk River and contaminated the Charleston, WV region's drinking water were surveyed and sampled. The objective of Task 3 was to assess concentration and variability of MCHM in homes in a focused study. Data resulting from the sampling effort will be used to support the design of a larger, more comprehensive sampling and assessment program for the nine counties affected. Households were surveyed and sampled in eight (Boone, Cabell, Clay, Kanawha, Lincoln, Logan, Putnam, and Roane) of the nine counties affected by the chemical spill and between February 11, 2014 to February 18, 2014.

No affected homes in Jackson County were visited because the Jackson County residents contacted declined participation and switched to private well water in response to the contamination incident. Jackson County had the lowest number of West Virginia American Water (WVAW) customers of the nine counties affected. A second home in Putnam County near the Jackson County line was visited in lieu of visiting a residence in Jackson County.

During each household visit, three tasks were completed:

1. Residents were interviewed by the WV TAP project team;
2. Basic chemical and physical properties (temperature, pH, turbidity, chlorine residual) were determined for tap water from kitchen faucets and bathroom fixtures; and
3. Water samples were collected for detailed analyses at commercial laboratories.

Results of the tap water chemical analyses are presented in this document. Results of the resident interviews are presented in a companion report. Together, these two documents describe results of the WV TAP 10 home study.

## 2.0 Methods

### *2.1 Field Water Sample Collection, Analysis, and Shipping*

Three individuals conducted home sampling and surveying. Premise plumbing sampling was done for four tap conditions in the following order: (1) kitchen cold tap; (2) kitchen hot tap; (3) cold water from the most frequently used bathtub; and (4) hot water from the most frequently used bathtub. Onsite water quality measurements included water temperature, pH, turbidity, free and total chlorine, and odor. The physical measurements were taken at each tap before sample collection. The time was recorded at the beginning of sampling at each tap, and when each sample bottle for chemical analysis was collected.

Total and free chlorine were measured separately using the HACH® Pocket Colorimeter™ II, Chlorine (Free and Total). The *N,N*-diethyl-*p*-phenyldiamine (DPD) reagents used were as follows: for total chlorine measurements, DPD reagent A3035, expiration date, 08/2018; and for free chlorine DPD reagent A3238, expiration date 02/2018.

Water temperature and pH levels were measured using a Thermo Scientific Orion 5 Star™ portable meter. The pH meter was calibrated at the beginning of each day of sampling using Fisher pH standards at pH 4, 7, and 10. Turbidity measurements were made using a HACH® 2100Q™ portable turbidimeter. Water samples were tested immediately upon collection at the temperatures recorded. After the physical measurements were recorded, one sampler collected approximately 120 mL tap water in a 250 mL beaker and covered the sample. The sample was then shaken several times while covered and presented to one of the three samplers who smelled it and made a record of the odor. In many instances the individual asked for a second sample before recording results. Each of the three samplers recorded results independently of the others so as not to influence one another. At the conclusion of the physical measurements at each tap, sample collection for laboratory analysis began.

Nine samples were collected for each tap condition. One set of triplicate samples was sent to the commercial laboratory ALS for analysis, a second set of triplicate samples was sent to ALS for archiving and a third set of triplicate samples was sent to the commercial laboratory Eurofins for analysis. The commercial laboratories provided sample containers for all samples. ALS samples for 4-methylcyclohexanemethanol (MCHM) and propylene glycol phenyl ether (PPH) were collected in a single 1 L amber glass bottle with 1 mg sodium thiosulfate and samples for total organic carbon (TOC) analysis were collected in 125 mL or 250 mL plastic bottles with sulfuric acid preservative. Eurofins samples for MCHM/PPH were collected in 1 L amber glass bottles and TOC samples were collected in 125 mL glass bottles. Sampling and recording at each tap condition took 5 minutes to 7 minutes.

After the tap condition samples were collected, a set of matrix spike (MS) and field blank (FB) samples were collected for each analytical laboratory and for archiving. MS and FB samples were collected in the same manner as tap water samples. MS samples were prepared for kitchen cold tap and kitchen hot tap conditions. The FB was a clean sample bottle from each laboratory filled at the kitchen sink counter with laboratory-purchased deionized (DI) water that was free of the analytes of interest. Field blanks are used to assess whether contamination with the analyte of interest (MCHM or PPH) occurred during sampling.

As soon as sampling was completed the bottles were placed in coolers and transported to a local hotel for icing, repacking, and shipping to the designated laboratory. Three laboratories, ALS Environmental Laboratory (Charleston, WV), Eurofins Lancaster Laboratories (Lancaster, PA) and Eurofins Analytical Laboratories (Monrovia, CA) were selected for this project. Samples for ALS Environmental Laboratory were picked each morning by ALS staff at 7 am. Coolers for shipment to Eurofins Laboratories were sent by FedEx® overnight and received on the next business day after shipping. All samples were received within hold times at both Eurofins Laboratories. Upon sample receipt at Eurofins Laboratories, cooler temperatures sometimes slightly exceeded the recommended standard 4°C for most drinking water samples. In these cases half of the samples were hot tap water, which is not typical of drinking water samples.

*2.2 Analysis Conducted by Commercial Laboratories*

The three laboratories that analyzed samples for this study reported different method detection limits (MDL) and minimum reporting limits (MRL) for TOC, PPH and 4-MCHM (**Table 1**). The MDL is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte (USCFR 1986). The MRL is the minimum concentration that can be reported as a quantitated value for a target analyte in a sample following analysis. This defined concentration can be no lower than the concentration of the lowest calibration standard for that analyte, and can be used only if acceptable quality control criteria for the analyte at this concentration are met. Put simply, the MDL indicates that the analyte is present at a concentration of greater than zero, and the MRL is the level at which the concentration of the analyte can be reported with confidence.

**Table 1. Minimum Detection Limits and Minimum Reporting Limits for the Two Commercial Laboratories**

| Contaminant[2] | ALS Environmental Laboratory Charleston, West Virginia | | Eurofins Laboratories[1] Lancaster, Pennsylvania Monrovia, California | |
|---|---|---|---|---|
| TOC, ppm | MDL = 0.07 | MRL = 0.50 | MDL = 0.04 | MRL = 0.30 |
| PPH, ppb | MDL = 3.7 | MRL = 5.1 | MDL = 0.5 | MRL = 1.0 |
| 4-MCHM, ppb | MDL = 2.7 | MRL = 5.0 | MDL = 0.5 | MRL = 1.0 |

1. Monrovia, California carried out TOC testing while Lancaster, Pennsylvania conducted 4-MCHM and PPH analysis
2. Parts per million (ppm); parts per billion (ppb)

2.2.1 ALS Environmental Laboratory. WV TAP samples were analyzed for TOC, MCHM, and PPH. TOC was determined via Standard Method 5310C. Samples exceeding the calibration range were diluted and reanalyzed. The instruments used for analysis were a 1010 Analyzer coupled with a 1051 Autosampler and a 1030W Analyzer coupled with a 1088 Autosampler, both manufactured by OI analytical. Before sample analysis, the instrument was calibrated using five calibration standards.

A method blank, a laboratory control sample (LCS) and a matrix spike/matrix spike duplicate (MS/MSD) pair were analyzed to serve as batch quality control. The method blank acceptance criterion was no detection of TOC above the reporting limit. The LCS (reagent water spiked at approximately the mid-point of the calibration curve) acceptance criterion was acceptable recovery within the laboratory control limits. Both method blank and LCS criteria needed to be met for the batch to be considered acceptable. The MS/MSD recoveries were also compared to laboratory control limits, and if outside of those, the parent sample would be qualified.

4-MCHM and PPH were examined according to standard US Environmental Protection Agency (US EPA) SW-846 methods for both preparation and analysis. The water samples, (approximately 1000 mL), were extracted using method 3510C with methylene chloride as the extraction solvent under an acidic pH. The extract was initially concentrated on a steam bath using a Kuderna Danish (KD) apparatus, and brought down to a final volume of 1.0 mL using nitrogen evaporation. The extract was then analyzed using method 8270C, which is a gas chromatograph/mass spectrometer (GC/MS) analysis technique. Prior to analysis the internal standards were added to each sample per the method requirements.

Before sample analysis, the GC/MS was tuned to meet the method Decafluorotriphenylphosphine (DFTPP) relative mass abundance criteria and calibrated using a six calibration standards. 4-MCHM was calibrated from 5 μg/mL to 500 μg/mL and PPH was calibrated from 2.5 μg/mL to 250 μg/mL. Instrument performance was verified prior to each 12-hour analytical sequence by the analysis of the DFTPP tune solution and continuing calibration standards, which were compared to the initial calibration curve. ALS instrumentation used for this project was an Agilent 5890/5973 GC/MS system.

With each preparation batch (not to exceed 20 field samples), a method blank, a LCS and a MS/MSD pair were extracted to serve as batch quality control. The method blank acceptance criterion was no detection of target analytes above the reporting limit. The LCS (reagent water spiked at approximately the mid-point of the calibration curve) acceptance criterion was acceptable recoveries within the laboratory control limits for both of the target compounds. Both method blank and LCS criteria needed to be met for the extraction batch to be considered acceptable. The MS/MSD recoveries were also compared to laboratory control limits, and if outside of those, the parent sample would be qualified. All field and quality control samples were spiked with the surrogate standards listed in EPA SW-846, Method 8270C to measure extraction efficiency. The surrogate recoveries were compared to laboratory control limits and, if within those limits, the results were considered acceptable and valid to be reported.

2.2.2 Eurofins Laboratories (Lancaster and Monrovia). 4-MCHM and PPH analyses were carried out by application of the following methods. A water sample was serially extracted with methylene chloride following EPA SW-846, Method 3510. The resulting extract was reduced in volume and an aliquot was injected into a GC/MS. The GC/MS analytical system was tuned and calibrated following the principles outlined in EPA SW-846, Method 8270D. This included tuning the system to DFTPP relative mass abundance criteria and calibration using a minimum of five calibration points from 1 ppb to 60 ppb. An internal standard based initial calibration was used. The analytical system was tuned and the calibration responses checked, relative to the initial calibration responses, every 12 hours.

Field samples were extracted in batches that were not to exceed 20 field samples. With every extraction batch, a method blank, a LCS and an MRL LCS were extracted to monitor the effectiveness of the extraction batch. A method blank was free of target compounds to be considered acceptable. The LCS (which was an aliquot of laboratory water spiked at approximately the mid-point of the calibration curve) and the MRL LCS (laboratory water spiked at or near the MRL) must have demonstrated acceptable recoveries of the target compounds for the extraction batch to be considered acceptable. Additionally, every field sample, method blank, LCS and MRL LCS were spiked with a surrogate standard that also went through the extraction process. If the surrogate standard recovery was acceptable then the inference was that any target compound present in the field sample was recovered. The work was performed on an Agilent 7890 GC with an Agilent 5975 MSD.

## 3.0 RESULTS AND DISCUSSION

### *3.1 Tap Water Analysis for Basic Parameters*

On-site measurements of tap water quality are summarized in **Table 2.** Tap water temperature is important because temperature influences the contaminant volatility. Volatilized compounds can contribute to resident chemical exposure and off-odors. Cold tap water temperatures ranged from

6.9°C to 21.9°C and hot water temperature ranged from 31.6°C to 58.1°C. Water pH values were within the US EPA Secondary Maximum Contaminant Level (MCL) of 6.5 to 9.5. Nearly all the tap water pH levels found in homes however, exceeded the pH levels leaving WVAW (pH 7.1 to pH 7.3). No chlorine concentrations exceeded the US EPA Primary MCL of 4.0 ppm. As expected, both total and free chlorine concentrations were greater for cold water than hot water within homes. Tap water turbidity levels were in the expected range and varied from 0.05 NTU to 1.47 NTU.

**Table 2. Range of Tap Water Quality Conditions Observed Across all Ten Homes**

| Parameter[1] | Kitchen Sink Faucet | | Bathtub Faucet | |
|---|---|---|---|---|
| | Cold | Hot | Cold | Hot |
| Temperature, °C | 6.9 to 21.9 | 31.6 to 47.7 | 7.0 to 14.6 | 33.6 to 58.1 |
| Water pH, unitless | 7.5 to 8.3 | 7.0 to 7.5 | 7.4 to 8.1 | 7.0 to 7.5 |
| Total Chlorine, ppm | 2.2 to 2.8 | 0.2 to 2.4 | 2.0 to 3.1 | 0.6 to 2.4 |
| Free Chlorine, ppm | 2.0 to 2.9 | 0.1 to 2.0 | 2.0 to 2.9 | 0.6 to 2.1 |
| Turbidity, NTU | 0.05 to 1.47 | 0.05 to 0.65 | 0.06 to 1.62 | 0.07 to 0.54 |

*1. NTU = Nephelometric turbidity units; Total chlorine represents free chlorine and combined chlorine results; Results represent a single measurement conducted at each tap within each home*

Tap water odors were detected in all 10 homes studied. The sampling team frequently noted licorice, sweet, and chlorine odors. Musty odors were reported less frequently. Licorice odors (considered to be a typical odor of MCHM) were only reported in three of the 10 homes studied. These odors were considered "sharp" and were similar to the licorice odor detected by one team member January 17-22, 2014 during a previous tap water sampling visit to Kanawha, Lincoln, and Putnam Counties. The intensity of the licorice odors observed during the present study were significantly less than those observed in January following discovery of the contaminated tap water. Sweet odors were reported in 7 of 10 homes visited.

Chlorine odors were detected in tap water from 9 of the 10 homes studied, and were reported less frequently for cold water than for hot water samples. This finding is likely due to the fact that hot water had less chlorine present than cold water (**Table 2**). Consumers have been shown to detect chlorine odors in tap water at 25°C when chlorine is present at 0.28 ppm [pH 5] and 0.36 ppm [pH 10] (Krasner and Barrett 1984). With the exception of a single water sample, all tap water contained chlorine above both odor threshold values. Though, for the single 0.1 ppm chlorine water sample, the sampling team detected a chlorine odor likely because its temperature was 41°C and volatilized readily from the tap water. A musty odor was reported in two of the ten homes studied, but only in hot water samples and not from both taps. In some cases, licorice, sweet, and musty odors were observed even when chlorine odors were also detected.

*3.2 Organic Carbon Tap Water Levels*

TOC concentrations were quantified for premise plumbing because TOC is a general indicator for organic contaminants present in drinking water and has been proposed by the US EPA and others as a metric for determining if drinking water contamination exists (Murray et al., 2010; Hall et al., 2007). There are no Federal or State drinking water regulatory standards for TOC tap water levels because TOC represents many compounds (not a single contaminant), and because the compounds contributing to the TOC may be benign.

TOC concentrations across and within all homes were relatively similar and were generally between 0.72 ppm and 0.92 ppm (**Figures 1 and 2**). A very high TOC concentration was observed for a single sample (6.3 ppm, house 2, kitchen tap cold water, ALS Environmental Laboratory) and was treated as an outlier. Concentrations observed in the water samples are typical of those in finished drinking waters and provide no information regarding the extent of contamination by MCHM or other potential contaminants. At the concentrations of interest, MCHM, PPH and other potential decay products of MCHM would make up a small portion of the overall organic carbon present in the tap water. Ninety percent of all TOC concentrations were less than 0.90 ppm. Standard deviation values (an indication of how much variation in TOC there is between samples collected in the same house) were relatively small, ranging from 0 ppm to 0.18 ppm.

*3.2 PPH and 4-MCHM*

No PPH was detected in any tap water sample by either commercial laboratory. No 4-MCHM was detected in any tap water sample by ALS Environmental Laboratory, but the Eurofins Lancaster Laboratory detected 4-MCHM in 105 of the 120 samples analyzed. The 105 detections can be attributed to Eurofins Lancaster Laboratory's lower MDL (**Table 1**).

4-MCHM was detected in all 10 homes, but all observed concentrations were substantially less than the 10 ppb State of West Virginia Screening Level (**Figure 3**). Ninety percent of samples had a 4-MCHM concentration equal to or less than 2.4 ppb. Home #8 had the greatest mean 4-MCHM concentration (4.4 ± 1.4 ppb), and the highest observed concentration (6.1 ppb). No consistent association was found between 4-MCHM concentrations and tap condition.

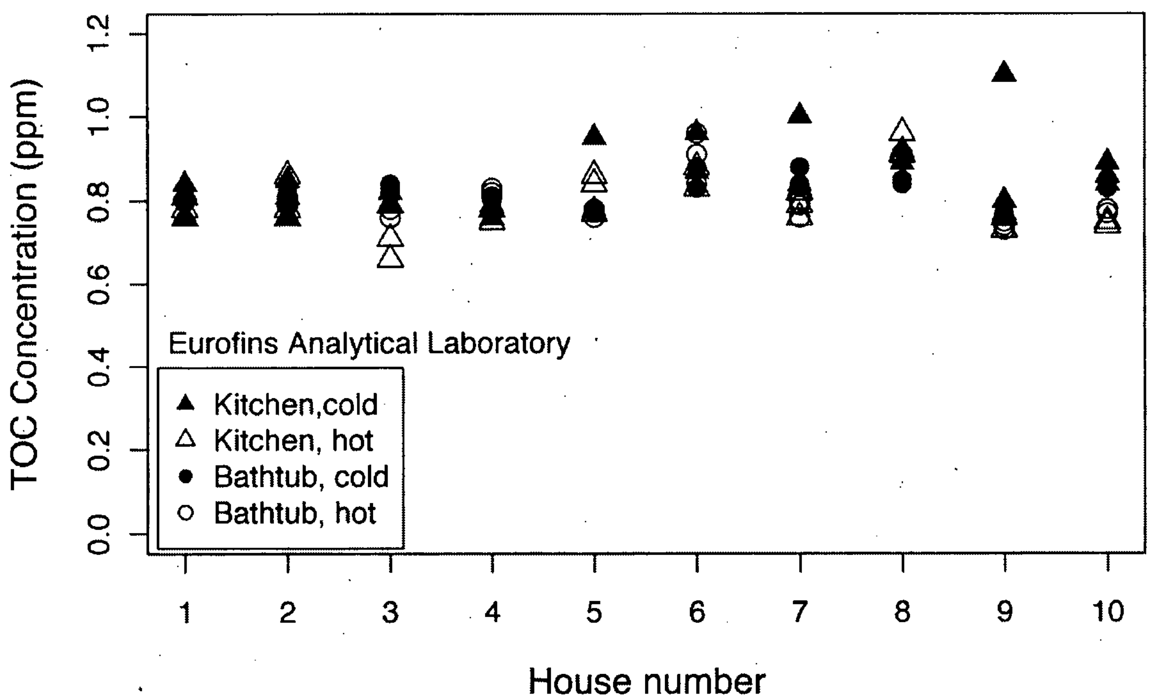


**Figure 1. Mean TOC Concentration Across Homes as Reported by Eurofins Analytical Laboratory**

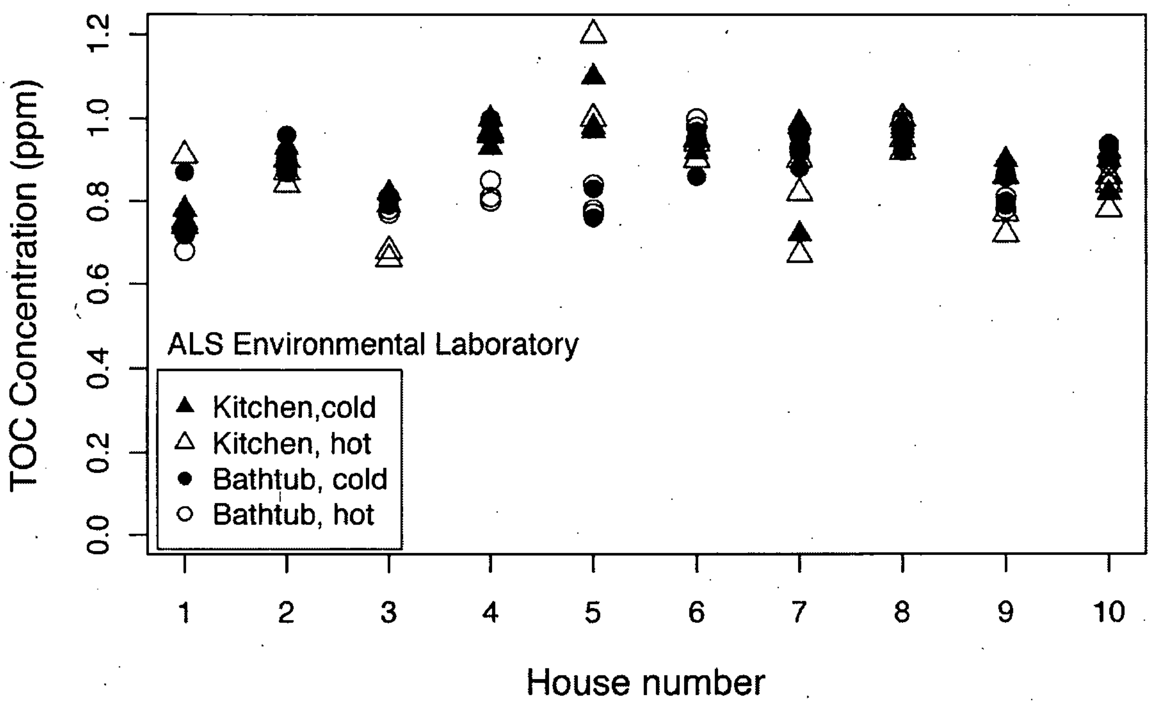


**Figure 2. Mean TOC Concentration Across Homes as Reported by ALS Environmental Laboratory.** A single apparent outlier (TOC = 6.3 mg/L for house 2) was omitted from the plot.

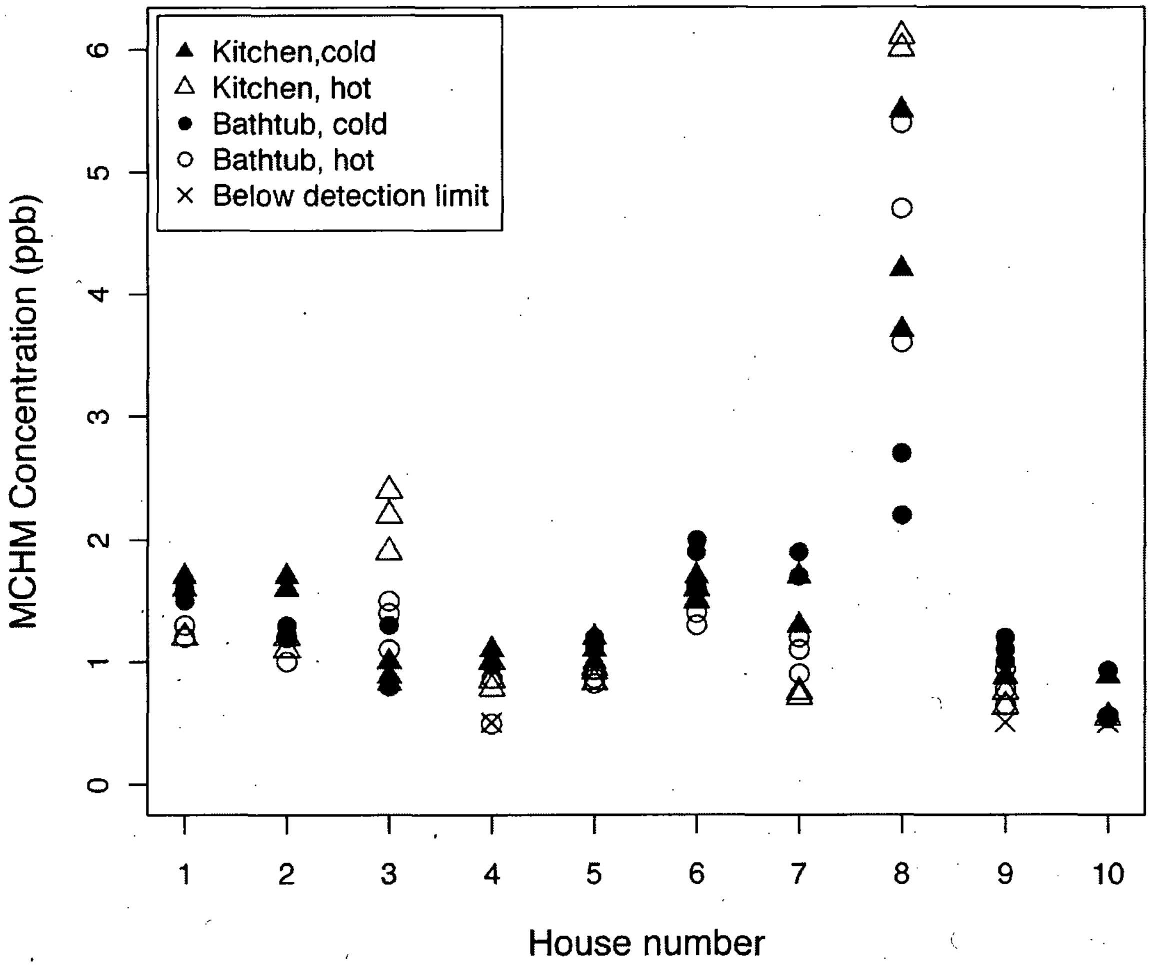


**Figure 3. 4-MCHM Concentration by Home and Tap Condition.** Only Eurofins Analytical Laboratory results shown because 4-MCHM was not detected in any samples analyzed by ALS Environmental Laboratory.

**Table 3. Comparison of Tap Water Odor Descriptors, 4-MCHM and Free Chlorine Concentrations**

| Location and Water Temperature | | 4-MCHM, ppb | Free $Cl_2$, ppm | Licorice | Chlorine | Musty | Sweet |
|---|---|---|---|---|---|---|---|
| Home 1 | Kitchen Cold | 1.6 | 2.30 | √ | √ | - | - |
| | Kitchen Hot | 1.2 | 1.40 | √ | √ | - | - |
| | Bath Cold | 1.5 | 2.70 | √ | √ | - | - |
| | Bath Hot* | 1.3 | 1.80 | - | - | - | - |
| Home 2 | Kitchen Cold | 1.6 | 2.60 | √ | √ | - | - |
| | Kitchen Hot | 1.1 | 2.20 | - | √ | - | - |
| | Bath Cold | 1.2 | 2.60 | - | √ | - | - |
| | Bath Hot | 1.1 | 2.20 | - | - | √ | - |
| Home 3 | Kitchen Cold | 0.9 | 2.60 | - | √ | - | - |
| | Kitchen Hot | 2.2 | 0.20 | √ | √ | - | - |
| | Bath Cold | 1.1 | 3.00 | - | Y | - | - |
| | Bath Hot* | 1.3 | 1.10 | √ | - | - | - |
| Home 4 | Kitchen Cold | 1.1 | 2.70 | - | √ | - | √ |
| | Kitchen Hot | 0.9 | 2.40 | - | √ | √ | - |
| | Bath Cold | 1.0 | 3.10 | - | √ | - | - |
| | Bath Hot | 0.7 | 2.40 | - | - | - | - |
| Home 5 | Kitchen Cold | 1.1 | 2.40 | - | √ | - | √ |
| | Kitchen Hot | 0.9 | 1.80 | - | - | - | - |
| | Bath Cold | 1.1 | 2.80 | - | √ | - | √ |
| | Bath Hot | 0.9 | 2.00 | - | √ | - | - |
| Home 6 | Kitchen Cold | 1.6 | 2.70 | - | - | - | √ |
| | Kitchen Hot | 1.5 | 1.60 | - | - | - | √ |
| | Bath Cold | 2.0 | 2.40 | - | - | - | √ |
| | Bath Hot | 1.4 | 1.90 | - | - | - | - |
| Home 7 | Kitchen Cold | 1.6 | 2.20 | - | √ | - | - |
| | Kitchen Hot | 0.7 | 0.50 | - | √ | - | √ |
| | Bath Cold | 1.8 | 2.40 | - | √ | - | - |
| | Bath Hot | 1.1 | 0.60 | - | - | - | - |
| Home 8 | Kitchen Cold | 4.5 | 2.60 | - | √ | - | - |
| | Kitchen Hot | 6.1 | 1.90 | - | √ | - | √ |
| | Bath Cold | 2.5 | 2.70 | - | √ | - | √ |
| | Bath Hot | 4.6 | 2.00 | - | √ | - | √ |
| Home 9 | Kitchen Cold | 0.9 | 2.80 | - | √ | - | - |
| | Kitchen Hot | 0.7 | 1.90 | - | √ | - | √ |
| | Bath Cold | 1.1 | 3.10 | - | √ | - | - |
| | Bath Hot | 0.8 | 2.20 | - | - | - | √ |
| Home 10 | Kitchen Cold | 0.7 | 2.20 | - | √ | - | √ |
| | Kitchen Hot | 0.5 | 1.50 | - | - | - | √ |
| | Bath Cold | 0.7 | 2.00 | - | √ | - | - |
| | Bath Hot | 0.5 | 1.80 | - | - | - | √ |

*Results for 4-MCHM data represent the mean of three discrete water samples collected from each location. Free chlorine data represent a single measurement at each location before water was collected for 4-MCHM analysis. Hyphen (-) indicates odor type was not detected by the tap water sampling team. Check mark (√) indicates an odor descriptor of "chemical" was reported by the tap water sampling team.*

## 4.0 VALUE OF PARAMETERS MONITORED AND PATH FORWARD

### *4.1 Important Parameters*

Among the water quality parameters assessed in tap water, only MCHM concentration, odor, temperature and chlorine concentration were useful in assessing the impact of the spill on premise plumbing. Any further sampling should be focused on those parameters. MCHM concentration and odor provide direct measures of the impact of the spill and temperature and chlorine concentration have indirect effects because they are related to odor.

4-MCHM analysis was valuable and should be included in additional studies. However, it is critically important that laboratories selected can detect and quantify low concentrations of MCHM (e.g., at the Eurofins MDL of 0.5 ppb). As time since the spill elapses, 4-MCHM concentrations are expected to continue declining in the absence of a source in the water treatment facility, distribution system, and/or premise plumbing systems.

### *4.2 Needed Research*

This study was designed as a focused residential drinking water sampling field study that supports the design of a larger, more comprehensive characterization for the nine counties affected. The study produced sufficient data for design of the larger study, but raised numerous questions regarding tap water chemical and odor quality at affected buildings. Those questions are presented below.

4.2.1 Expansive In-Home Tap Water Sampling Study

If an expanded in-home tap water survey were conducted, the following questions could inform the sampling plan:

1. How does water age affect 4-MCHM concentration?
2. What is the variability in 4-MCHM concentration between homes within the same pressure zone?
3. Does the residence time of the tap water in premise plumbing influence the 4-MCHM concentration?
4. Do certain plumbing materials (metals and plastics) affect 4-MCHM concentrations?
5. Are there additional chemicals (either break-down products of MCHM or unrelated compounds) present causing odor?

4.2.2 Continued Source. The purpose of this study was not to identify the source of the 4-MCHM, but to characterize 4-MCHM tap water concentrations across the 10 homes studied. The finding that 4-MCHM was present in tap water from all homes studied demonstrates that customers were still being exposed to 4-MCHM contaminated tap water more than 1 month after the incident began. The source of ongoing 4-MCHM loading to the distribution system must be determined so as to predict the assets affected and decontamination actions needed. 4-MCHM could reside in plumbing systems, the WVAW distribution system, or both.

During the initial days of the incident, officials issued a Do Not Use order. This order resulted in contaminated water stagnating in place, and the consequences of this stagnation period and subsequent flushing of contaminated water through the infrastructure remain unknown. It is possible 4-MCHM adsorbed to or permeated into materials within the WVAW water distribution system and premise plumbing systems. Under this scenario, sequestered MCHM could gradually desorb into the drinking water over time and serve as an ongoing source of contamination.

Water distribution and premise plumbing systems are complex. They are comprised of both metal and plastic water transport components, storage tanks, and hot water heaters. Future studies could include a more detailed investigation into the fate and transport of 4-MCHM and minor components of crude MCHM in premise plumbing and drinking water infrastructure. A number of factors could contribute to detention of MCHM and gradual release from drinking water infrastructure. Corrosion scales on metal pipe surfaces increase the available surface area on which crude MCHM components or breakdown products could adsorb. Biofilms are also present in both drinking water distribution pipes and premise plumbing and could absorb contaminants. Corrosion scales and biofilms could present a greater problem in premise plumbing systems which have smaller diameter pipes than distribution systems pipes and higher surface area to water volume ratios. Prior studies indicate that certain plastics are penetrated more rapidly by organic chemicals than others. Biofilms, pipes, and hot water heaters are all potential in-home sources of crude MCHM components or any breakdown products that were formed.

4.2.3 Reevaluation of Decontamination Measures. The US EPA defines decontamination as "*the inactivation or reduction of contaminants by physical, chemical or other methods to meet a cleanup goal. Decontamination is a key component of the remediation phase in a contamination incident. During a water incident, once contamination and characterization are confirmed, decontamination is performed before returning a system to service.*" In accordance with the decontamination cleanup goals established by the State of West Virginia, affected infrastructure and plumbing systems had been decontaminated to a level below the 10 ppb screening level. Despite attainment of this goal, the presence of 4-MCHM at resident taps was objectionable to residents and negatively impacted public perception about their drinking water and their water utility. Those factors should be considered in a reassessment of the clean-up goals for this spill.

**5.0 CONCLUSION**

The purpose of this work was to conduct a focused residential drinking water field study that included a resident survey and tap water testing. Ten homes affected by the Crude MCHM Elk River chemical spill were surveyed and sampled in eight of the nine counties affected (Boone, Cabell, Clay, Kanawha, Lincoln, Logan, Putnam, and Roane counties). Upon arrival, tap water was characterized for pH, free and total chlorine concentration, turbidity, and odor at the kitchen sink and bathroom tub faucets. Cold water quality was examined first followed by hot water analysis. Water samples were then collected and shipped to two commercial laboratories for determination of TOC, 4-MCHM, and PPH concentrations. MRL and MDLs for their respective methods differed for the two laboratories.

The only parameters that were tested that appear to contribute any useful information for spill characterization and response are MCHM concentration, odor, temperature, and chlorine concentration. The contaminant 4-MCHM was detected in all 10 homes by Eurofins Analytical Laboratory, but not detected by ALS Environmental Laboratory in replicate water samples. This finding is significant and underscores the importance of selecting laboratories that can detect and quantify low concentrations of contaminants during a chemical contamination incident. The reason for this difference is likely due to 4-MCHM method MDL differences. Eurofins Analytical Laboratory's MDL and

MRL for 4-MHCM were nearly 0.5 ppb and 1.0 ppb while ALS Environmental Laboratory's MRL and MDL values were greater at 2.7 ppb and 5.0 ppb. Ninety percent of the 4-MCHM concentrations reported by Eurofins Analytical Laboratory were less than 2.4 ppb. Thus, ALS Environmental Laboratory's method could not detect the low levels of 4-MCHM present in tap water at a 4-MCHM concentration equal to or less than 2.4 ppb. Home #8 had the greatest average 4-MCHM concentration of 4.4 ± 1.4 ppb, and the maximum observed concentration of 6.1 ppb. No 4-MCHM concentration detected in any home exceeded the 10 ppb State of West Virginia screening level.

## 6.0 ACKNOWLEDGEMENT

Special thanks are extended to the residents who permitted the WV TAP team to enter their homes and test their tap water. These individuals, who will remain anonymous, have done a great service to thousands of West Virginians who were also affected by the spill. Appreciation is also extended to ALS Environmental Laboratory and Eurofins Laboratories for their participation.

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**FOR IMMEDIATE RELEASE**
**April 23, 2014**

## Findings of Emergency Department Record Review from Elk River Chemical Spill

**CHARLESTON, W.Va.** – West Virginia Department of Health and Human Resources Bureau for Public Health today released results from the medical chart review of patients who presented to 10 area hospital emergency departments in the 9 counties affected by the Elk River chemical spill between January 9 and 23, 2014.

West Virginia's Bureau for Public Health and scientists from the Centers for Disease Control and Prevention reviewed 584 charts to understand why people were going to the emergency department and whether any of the illnesses reported were serious. A total of 369 records were included in the analysis, representing patients who had symptoms and reported they were exposed to the water. Excluded from analysis were 213 records that did not include mention of exposure to MCHM-contaminated water, had no illness recorded, included a diagnosis unrelated to exposure to MCHM, noted that the individual left the hospital before being seen by a doctor, or were duplicates. Findings included these:

- The most common symptoms reported were nausea, rash, vomiting, abdominal pain, and diarrhea.

- The most common ways people were exposed to the water were bathing, showering, washing hands, or other skin contact.

- 356 (96.5%) of 369 persons were treated in the Emergency Department for their symptoms and released; some treatments included IV fluids and/or medications for nausea or itching.

- 13 (3.5%) of 369 persons were hospitalized; these admissions were of persons with chronic illnesses such as kidney, liver or lung disease.

"This analysis found that the symptoms reported by people exposed to MCHM in water appeared to be mild and short-lived which were resolved with minimal or no treatment," said Dr. Loretta Haddy, West Virginia State Epidemiologist and Director of the Office of Epidemiology and Prevention Services. "On the basis of the records provided by the hospitals, it was not possible to say that the illnesses were caused by exposure to MCHM."

The findings add to what is known about the possible health effects experienced by people living in the affected counties. The West Virginia Department of Health and Human Resources will use the medical records review and the results of the recently conducted Community Assessment for Public Health Emergency Response (CASPER) survey, which measures the health, economic, and other impact on the community as a whole, to make recommendations to strengthen emergency response in the future. West Virginia and CDC are also continuing to evaluate the data and will produce a scientific paper.

The findings of the investigation are available at www.wvdhhr.org.

###

# Elk River Chemical Spill Health Effects

## Findings of Emergency Department Record Review

## April 2014

## Collaborative Investigation by the West Virginia Bureau for Public Health (WVBPH) and the Agency for Toxic Substances Disease Registry (ATSDR)

**Background**

On January 9, 2014, approximately 10,000 gallons of 4-methylcyclohexanemethanol (MCHM) leaked into the Elk River 1 ½ miles upstream from the water intake for West Virginia American Water (WVAW) in Charleston, West Virginia. WVAW supplies water to about 300,000 people living in 100,000 households in 9 counties in West Virginia.

At 6 PM on January 9, WVAW issued a 'do not use' order. West Virginia Poison Center started receiving phone calls from people reporting rashes, nausea, vomiting, diarrhea, and other symptoms. Emergency Departments (EDs) started seeing an increase in visits, and the WVBPH began counting the number of ED visits on January 10.

MCHM is a chemical that can form bubbles like soap to help separate coal from other rocks and minerals. This process reduces air pollution caused by burning coal. Few studies on MCHM exist and most have been conducted on animals. MCHM has been tested on rats and guinea pigs. Exposure to liquid MCHM can cause skin and eye irritation, vomiting, and diarrhea. MCHM vapors in the air can also irritate the eyes, nose, throat, and lungs. When laboratory animals are exposed at high doses, MCHM has been shown to cause problems with the liver, kidneys, blood, and the brain.

On January 21, 2014, state officials learned that another material was part of the chemical release that occurred on January 9, 2014. A smaller amount (7% by volume) of a second chemical -- propylene glycol phenyl ether (PPH) -- was in the same tank and entered the water system at the same time as the MCHM. Health effects of PPH are similar to those caused by MCHM.

Public Health Officials at WVBPH wanted to understand why people were going to the ED and whether any of the illness reported was serious. WVBPH asked epidemiologists at Agency for Toxic Substances and Disease Registry (ATSDR) to help with the investigation. An epidemiologist is a public health scientist who tries to understand how and why illness occurs so illness can be stopped.

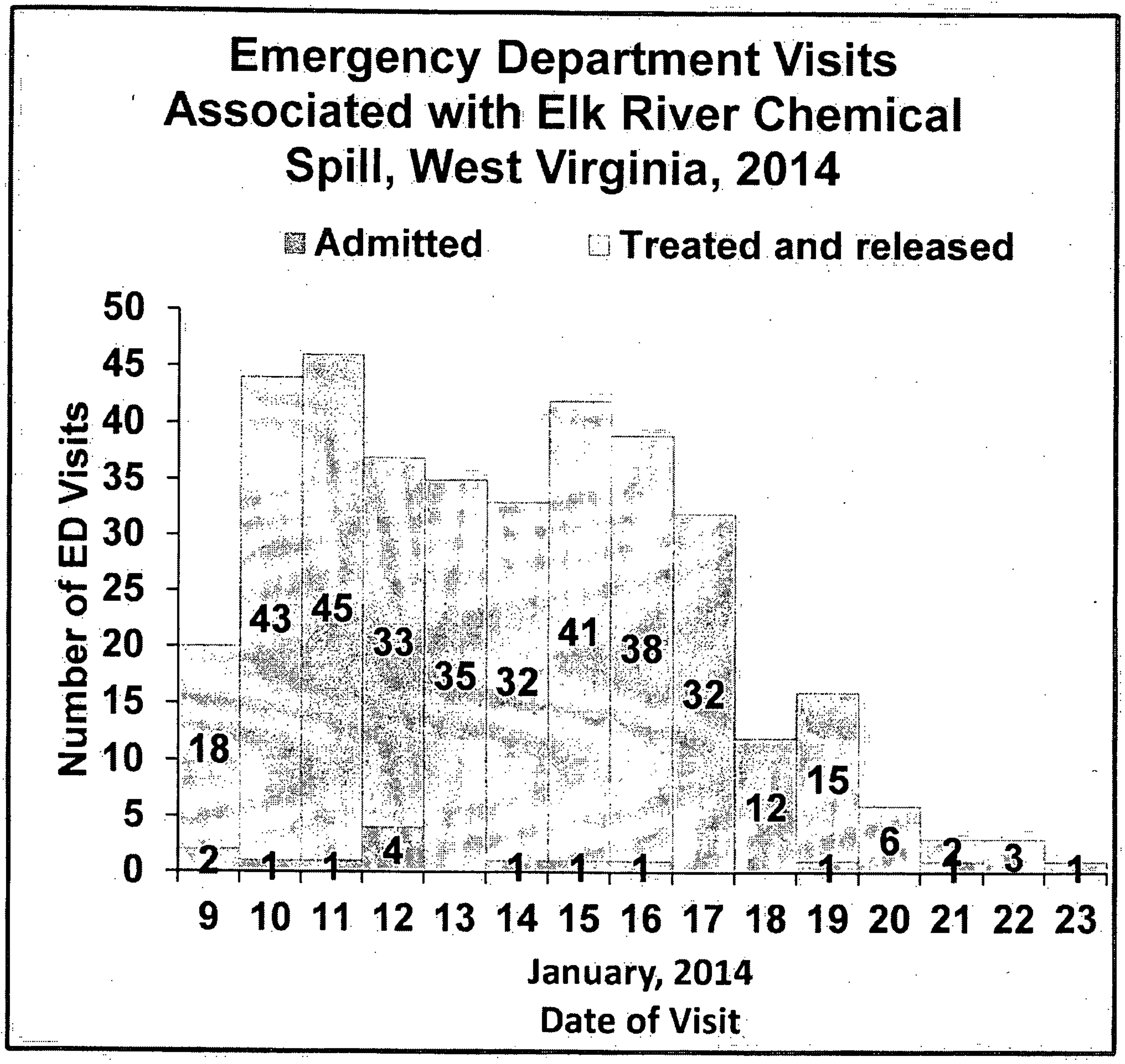
**How the investigation was done**

Epidemiologists from WVBPH and ATSDR put together a list of public health questions they wanted to answer. They wanted to know the kinds of symptoms people had and how they were exposed to the water. They also wanted to know what kind of treatment patients received and whether they had to be hospitalized. Epidemiologists listed all these questions on a form.

Hospitals were asked to release records for people who went to the ED between January 9 and 23, 2014, and reported illness related to the chemical spill. A total of 584 records were released to WVBPH for review. Using the form that included the public health questions, teams of WVBPH and ATSDR epidemiologists and nurses looked through each record to find answers to the questions.

**What the investigation found:**

- 369 records were included in the final analysis; these records were for patients who had symptoms and reported they were exposed to the water
- 215 records were ***not*** included in the final analysis because:
    - 41 people left the ED without being seen by a physician
    - 110 ED records did not record exposure to the contaminated water
    - 45 persons were given a diagnosis (e.g., influenza, strep throat, scabies, shingles, etc.) that was considered a more likely explanation for their illness
    - 3 persons had no symptoms of illness recorded in the record
    - 16 persons were duplicates, visiting the ED for the second or third time
- The number of ED visits went down during the second week after the chemical spill. In the graph below, the date of visit is shown on the 'X' axis along the bottom of the graph. The number of visits is shown on the 'Y' axis along the left side of the graph. Persons admitted to the hospital are shown in blue and persons treated and released are shown in pink.




- 13 (3.5%) of 369 persons were hospitalized. People who were admitted had chronic illnesses such as kidney, liver or lung disease.
- 356 (96.5%) of 369 persons were treated in the ED and released. Some treatments included IV fluids and/or medications for nausea or itching.
- The most common way people were exposed to the water was bathing, showering, washing hands, or other skin contact. (See Table 1.)

Table 1: Exposures to Water Reported by ED Patients, Elk River Chemical Spill, Charleston, West Virginia, January 2014

| Route* | Number | (%) |
|---|---|---|
| **Bathing, showering, other skin contact** | **194** | **(52.6)** |
| **Eating, drinking, swallowing** | **162** | **(43.9)** |
| **Breathing mist or vapor** | **54** | **(14.6)** |

*Patients could have more than one route of exposure recorded in the ED record.

- The most common symptoms reported were nausea, rash, vomiting, abdominal pain, and diarrhea. (See Table 2.)

Table 2: Most Commonly Reported Symptoms in ED Patients, Elk River Chemical Spill, Charleston, West Virginia, January 2014

| Symptom* | Number | (%) |
|---|---|---|
| Nausea | 141 | (37.9) |
| Rash | 105 | (28.5) |
| Vomiting | 104 | (28.2) |
| Abdominal pain | 90 | (24.4) |
| Diarrhea | 90 | (24.4) |
| Headache | 81 | (21.9) |
| Itching | 73 | (19.8) |
| Sore throat | 55 | (14.9) |
| Eye pain | 54 | (14.6) |
| Cough | 47 | (12.7) |

* Patients could have more than one symptom

- Results of laboratory tests done in the ED did not indicate any people had new kidney or liver damage.
- People who reported that they swallowed contaminated water or food were more likely to report gastrointestinal symptoms such as nausea, vomiting, and diarrhea. People who reported skin contact with contaminated water were more likely to report redness or itching of the skin.

**What does this information mean?**

- Symptoms associated with exposure to low levels of MCHM in this public water system appeared to be mild and resolved with no or minimal treatment, such as IV fluids after episodes of vomiting or diarrhea and/or medications to relieve nausea or itching.

- Most people who reported illness associated with the Elk River chemical spill were treated for their symptoms and released.

- Common symptoms included nausea, vomiting, diarrhea, skin rash, itching, headache, sore throat, and cough.

- These symptoms are consistent with known health effects of MCHM and with data reported by West Virginia Poison Center. It was possible that the symptoms reported to be caused by exposure to MCHM could have been caused by other mild clinical illness such as colds or flu or other viral infections.

- There are no laboratory tests or combination of signs and symptoms that can reliably distinguish mild illness caused by exposure to MCHM from mild illness.

- These data cannot 'prove' that MCHM caused the reported symptoms; however, these data are consistent with what is known about MCHM from animal studies.

**Next Steps**

- WVBPH collaborated with the Centers for Disease Control and Prevention (CDC) on a household survey known as a 'Community Assessment for Public Health Emergency Response' (CASPER) to measure the health, economic, and other impact of this incident on the community as a whole. The CASPER was conducted April 8-10, 2014, and findings will be released after analysis is complete. The number of persons seen in the ED (369) is a small proportion (0.12%) of the estimated 300,000 persons affected by the chemical spill. This household survey will be helpful in expanding the understanding of the impact on the entire population.

- WVBPH epidemiologists will use the information from the ED medical record review and the CASPER to make recommendations to strengthen emergency response in the future.

- Epidemiologists will continue to evaluate this data and finalize a scientific paper. Writing and talking about scientific findings will help everyone better understand all the issues surrounding this investigation.

Ex. 5 - Deliberative

Ex. 5 - Deliberative

ENROLLED

COMMITTEE SUBSTITUTE

FOR

COMMITTEE SUBSTITUTE

FOR

# Senate Bill No. 373

(SENATORS UNGER, KESSLER (MR. PRESIDENT), PALUMBO, PLYMALE, LAIRD, YOST, MILLER, PREZIOSO, FITZSIMMONS, WELLS, CANN, CHAFIN, TUCKER, STOLLINGS, COOKMAN AND SNYDER, *original sponsors*)

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[Passed March 8, 2014; in effect ninety days from passage.]

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AN ACT to amend and reenact §16-1-2 and §16-1-9a of the Code of West Virginia, 1931, as amended; to amend said code by adding thereto three new sections, designated §16-1-9c, §16-1-9d and §16-1-9e; to amend and reenact §22-26-2, §22-26-3, §22-26-5, §22-26-6, §22-26-7 and §22-26-8 of said code; to amend said code by adding thereto a new article, designated §22-30-1, §22-30-2, §22-30-3, §22-30-4, §22-30-5, §22-30-6, §22-30-7, §22-30-8, §22-30-9, §22-30-10, §22-30-11, §22-30-12, §22-30-13, §22-30-14, §22-30-15, §22-30-16, §22-30-17, §22-30-18, §22-30-19, §22-30-20, §22-30-21, §22-30-22, §22-30-23, §22-30-24 and §22-30-25; to amend said code by adding thereto a new article, designated §22-31-1, §22-31-2, §22-31-3, §22-31-4, §22-31-5, §22-31-6, §22-31-7, §22-31-8, §22-31-9, §22-31-10, §22-31-11 and

§22-31-12; and to amend said code by adding thereto a new article, designated §24-2G-1 and §24-2G-2, all relating to the protection of water resources and public health generally; defining terms generally; providing for rulemaking generally; providing for civil and criminal penalties generally; providing for the regulation of the public water systems by the Commissioner of the Bureau for Public Health; providing for entry into and evaluations of water systems; authorizing commissioner to seek injunctive relief; requiring source water protection plans; specifying contents of plan; requiring assessment and monitoring of plans; requiring Bureau of Public Health to coordinate the conduct of a long-term medical study; continuing wellhead and source water protection grant program; continuing grant fund to provide water source protection; revising the Water Resources Protection and Management Act; modifying registration requirements; requiring reports to the Secretary of the Department of Environmental Protection; requiring reports by secretary to legislative entities; requiring continuation of matching funds for stream-gauging network; modifying duties of legislative commission; requiring water resources survey and registry; requiring information from drilling contractors for water systems; adopting state water resources management plan; requiring reports from certain water users; establishing the Aboveground Storage Tank Act; requiring the secretary to compile inventory of aboveground storage tanks in the state; requiring registration; authorizing certain fees; requiring secretary to develop regulatory program for the tanks; providing minimum factors to be included in program; requiring annual inspection and certification of the tanks; requiring evidence of financial security; requiring corrective action and plans; requiring spill prevention response plans; requiring notice of inventory of tanks to local water systems and governments; requiring the posting of signs at the tanks; creating an administrative fund; creating the Protect Our Water Fund; authorizing public access to certain information;

authorizing inspections, monitoring and testing by secretary; authorizing secretary to issue administrative orders and seek injunctive relief; allowing appeals to Environmental Quality Board; prohibiting duplicative enforcement; requiring secretary to report to legislative entities; requiring interagency coordination; establishing duties of secretary upon imminent and substantial danger; providing additional duties and powers of secretary generally; providing certain exemptions; creating the Public Water Supply Protection Act; requiring inventories of sources of certain contaminants in the zones of critical concern of certain public water systems; requiring registration and permits; authorizing inspections, monitoring and testing by secretary; requiring individual NPDES permits in certain circumstances; authorizing secretary to require NPDES permits in certain circumstances; creating public water system supply study commission; membership of study commission; scope of study; establishing reporting requirements; requiring the establishment of advance warning, testing and monitoring at certain water utilities; requiring certain information be filed with the Public Water Commission; and requiring utility to report back to Legislature if technology is infeasible.

*Be it enacted by the Legislature of West Virginia:*

That §16-1-2 and §16-1-9a of the Code of West Virginia, 1931, as amended, be amended and reenacted; that said code be amended by adding thereto three new sections, designated §16-1-9c, §16-1-9d and §16-1-9e; that §22-26-2, §22-26-3, §22-26-5, §22-26-6, §22-26-7 and §22-26-8 of said code be amended and reenacted; that said code be amended by adding thereto a new article, designated §22-30-1, §22-30-2, §22-30-3, §22-30-4, §22-30-5, §22-30-6, §22-30-7, §22-30-8, §22-30-9, §22-30-10, §22-30-11, §22-30-12, §22-30-13, §22-30-14, §22-30-15, §22-30-16, §22-30-17, §22-30-18, §22-30-19, §22-30-20, §22-30-21, §22-30-22, §22-30-23, §22-30-24 and §22-30-25; that said code be amended by adding thereto a new article, designated §22-31-1, §22-31-2,

§22-31-3, §22-31-4, §22-31-5, §22-31-6, §22-31-7, §22-31-8, §22-31-9, §22-31-10, §22-31-11 and §22-31-12; and that said code be amended by adding thereto a new article, designated §24-2G-1 and §24-2G-2, all to read as follows:

## CHAPTER 16. PUBLIC HEALTH.

### ARTICLE 1. STATE PUBLIC HEALTH SYSTEM.

**§16-1-2. Definitions.**

As used in this article:

(1) "Basic public health services" means those services that are necessary to protect the health of the public. The three areas of basic public health services are communicable and reportable disease prevention and control, community health promotion and environmental health protection;

(2) "Bureau" means the Bureau for Public Health in the department;

(3) "Combined local board of health" means one form of organization for a local board of health and means a board of health serving any two or more counties or any county or counties and one or more municipalities within or partially within the county or counties;

(4) "Commissioner" means the commissioner of the bureau, who is the state health officer;

(5) "County board of health" means one form of organization for a local board of health and means a local board of health serving a single county;

(6) "Department" means the West Virginia Department of Health and Human Resources;

(7) "Director" or "director of health" means the state health officer. Administratively within the department, the bureau through its commissioner carries out the public health functions of the department, unless otherwise assigned by the secretary;

(8) "Essential public health services" means the core public health activities necessary to promote health and prevent disease, injury and disability for the citizens of the state. The services include:

(A) Monitoring health status to identify community health problems;

(B) Diagnosing and investigating health problems and health hazards in the community;

(C) Informing, educating and empowering people about health issues;

(D) Mobilizing community partnerships to identify and solve health problems;

(E) Developing policies and plans that support individual and community health efforts;

(F) Enforcing laws and rules that protect health and ensure safety;

(G) Uniting people with needed personal health services and assuring the provision of health care when it is otherwise not available;

(H) Promoting a competent public health and personal health care workforce;

(I) Evaluating the effectiveness, accessibility and quality of personal and population-based health services; and

(J) Researching for new insights and innovative solutions to health problems;

(9) "Licensing boards" means those boards charged with regulating an occupation, business or profession and on which the commissioner serves as a member;

(10) "Local board of health", "local board" or "board" means a board of health serving one or more counties or one or more municipalities or a combination thereof;

(11) "Local health department" means the staff of the local board of health;

(12) "Local health officer" means the physician with a current West Virginia license to practice medicine who supervises and directs the activities, services, staff and facilities of the local health department and is appointed by the local board of health with approval by the commissioner;

(13) "Municipal board of health" means one form of organization for a local board of health and means a board of health serving a single municipality;

(14) "Performance-based standards" means generally accepted, objective standards such as rules or guidelines against which public health performance can be measured;

(15) "Potential source of significant contamination" means a facility or activity that stores, uses or produces substances or compounds with potential for significant contaminating impact if released into the source water of a public water supply.

(16) "Program plan" or "plan of operation" means the annual plan for each local board of health that must be submitted to the commissioner for approval;

(17) "Public groundwater supply source" means a primary source of water supply for a public water system which is directly drawn from a well, underground stream, underground reservoir, underground mine or other primary source of water supplies which is found underneath the surface of the state.

(18) "Public surface water supply source" means a primary source of water supply for a public water system which is directly drawn from rivers, streams, lakes, ponds, impoundments or other primary sources of water supplies which are found on the surface of the state.

(19) "Public surface water influenced groundwater supply source" means a source of water supply for a public water system which is directly drawn from an underground well, underground river or stream, underground reservoir or underground mine, and the quantity and quality of the water in that underground supply source is heavily influenced, directly or indirectly, by the quantity and quality of surface water in the immediate area.

(20) "Public water system" means:

(A) Any water supply or system which regularly supplies or offers to supply water for human consumption through pipes or other constructed conveyances, if serving at least an average of twenty-five individuals per day for at least sixty days per year, or which has at least fifteen service connections, and shall include:

(i) Any collection, treatment, storage and distribution facilities under the control of the owner or operator of the system and used primarily in connection with the system; and

(ii) Any collection or pretreatment storage facilities not under such control which are used primarily in connection with the system.

(B) A public water system does not include a system which meets all of the following conditions:

(i) Consists only of distribution and storage facilities and does not have any collection and treatment facilities;

(ii) Obtains all of its water from, but is not owned or operated by, a public water system which otherwise meets the definition;

(iii) Does not sell water to any person; and

(iv) Is not a carrier conveying passengers in interstate commerce.

(21) "Public water utility" means a public water system which is regulated by the West Virginia Public Service Commission pursuant to the provisions of chapter twenty-four of this code.

(22) "Secretary" means the secretary of the department;

(23) "Service area" means the territorial jurisdiction of a local board of health;

(24) "State Advisory Council on Public Health" means the advisory body charged by this article with providing

advice to the commissioner with respect to the provision of adequate public health services for all areas in the state;

(25) "State Board of Health" means the secretary, notwithstanding any other provision of this code to the contrary, whenever and wherever in this code there is a reference to the State Board of Health.

(26) "Zone of critical concern" for a public surface water supply is a corridor along streams within a watershed that warrant more detailed scrutiny due to its proximity to the surface water intake and the intake's susceptibility to potential contaminants within that corridor. The zone of critical concern is determined using a mathematical model that accounts for stream flows, gradient and area topography. The length of the zone of critical concern is based on a five-hour time of travel of water in the streams to the water intake, plus an additional one-fourth mile below the water intake. The width of the zone of critical concern is one thousand feet measured horizontally from each bank of the principal stream and five hundred feet measured horizontally from each bank of the tributaries draining into the principal stream.

**§16-1-9a. Regulation of public water systems.**

(a) The commissioner shall regulate public water systems as prescribed in this section.

(b) The commissioner shall establish by legislative rule, in accordance with article three, chapter twenty-nine-a of this code:

(1) The maximum contaminant levels to which all public water systems shall conform in order to prevent adverse effects on the health of individuals;

(2) Treatment techniques that reduce the contaminant or contaminants to a level which will not adversely affect the health of the consumer;

(3) Provisions to protect and prevent contamination of wellheads and well fields used by public water supplies so that contaminants do not reach a level that would adversely affect the health of the consumer;

(4) Minimum requirements for:

(A) Sampling and testing;

(B) System operation;

(C) Public notification by a public water system on being granted a variance or exemption or upon failure to comply with specific requirements of this section and regulations promulgated under this section;

(D) Recordkeeping;

(E) Laboratory certification; and

(F) Procedures and conditions for granting variances and exemptions to public water systems from state public water systems' regulations.

(5) Requirements covering the production and distribution of bottled drinking water;

(6) Requirements governing the taste, odor, appearance and other consumer acceptability parameters of drinking water; and

(7) Any other requirement the commissioner finds necessary to effectuate the provisions of this article.

(c) The commissioner or his or her authorized representatives or designees may enter any part of a public water system, whether or not the system is in violation of a legal requirement, for the purpose of inspecting, sampling or testing and shall be furnished records or information reasonably required for a complete inspection.

(d) The commissioner, his or her authorized representative or designee may conduct an evaluation necessary to assure the public water system meets federal safe drinking water requirements. The public water system shall provide a written response to the commissioner within thirty days of receipt of the evaluation by the public water system, addressing corrective actions to be taken as a result of the evaluation.

(e)(1) Any individual or entity who violates any provision of this article, or any of the rules or orders issued pursuant to this article, is liable for a civil penalty not less than $1,000 nor more than $5,000. Each day's violation shall constitute a separate offense.

(2) For a willful violation of a provision of this article, or of any of the rules or orders issued under this article, an individual or entity shall be subject to a civil penalty of not more than $10,000 and each day's violation shall be grounds for a separate penalty.

(3) Civil penalties are payable to the commissioner. All moneys collected under this section shall be deposited into a restricted account known as the Safe Drinking Water Fund. All moneys deposited into the fund shall be used by the commissioner to provide technical assistance to public water systems.

(f) The commissioner, or his or her authorized representative, may also seek injunctive relief in the circuit court of the county in which all or part of the public water system is located for threatened or continuing violations.

**§16-1-9c. Required update or completion of source water protection plans.**

(a) On or before July 1, 2016, each existing public water utility which draws and treats water from a surface water supply source or a surface water influenced groundwater supply source shall submit to the commissioner an updated or completed source water protection plan for each of its public water system plants with such intakes to protect its public water supplies from contamination. Every effort shall be made to inform and engage the public, local governments, local emergency planners, local health departments and affected residents at all levels of the development of the protection plan.

(b) The completed or updated plan for each affected plant, at a minimum, shall include the following:

(1) A contingency plan that documents each public water utility's planned response to contamination of its public surface water supply source or its public surface water influenced groundwater supply source;

(2) An examination and analysis of the public water system's ability to isolate or divert contaminated waters from its surface water intake or groundwater supply, and the amount of raw water storage capacity for the public water system's plant;

(3) An examination and analysis of the public water system's existing ability to switch to an alternative water

source or intake in the event of contamination of its primary water source;

(4) An analysis and examination of the public water system's existing ability to close its water intake in the event the system is advised that its primary water source has become contaminated due to a spill or release into a stream, and the duration of time it can keep that water intake closed without creating a public health emergency;

(5) The following operational information for each plant receiving water supplies from a surface water source:

(A) The average number of hours the plant operates each day, and the maximum and minimum number of hours of operation in one day at that plant during the past year; and

(B) The average quantities of water treated and produced by the plant per day, and the maximum and minimum quantities of water treated and produced at that plant in one day during the past year;

(6) An analysis and examination of the public water system's existing available storage capacity on its system, how its available storage capacity compares to the public water system's normal daily usage and whether the public water system's existing available storage capacity can be effectively utilized to minimize the threat of contamination to its system;

(7) The calculated level of unaccounted for water experienced by the public water system for each surface water intake, determined by comparing the measured quantities of water which are actually received and used by customers served by that water plant to the total quantities of water treated at the water plant over the past year. If the

calculated ratio of those two figures is less than eighty-five percent, the public water system is to describe all of the measures it is actively taking to reduce the level of water loss experienced on its system;

(8) A list of the potential sources of significant contamination contained within the zone of critical concern as provided by the Department of Environmental Protection, the Bureau for Public Health and the Division of Homeland Security and Emergency Management. The exact location of the contaminants within the zone of critical concern is not subject to public disclosure in response to a Freedom of Information Act request under article one, chapter twenty-nine-b of this code. However, the location, characteristics and approximate quantities of potential sources of significant contamination within the zone of critical concern shall be made known to one or more designees of the public water utility, and shall be maintained in a confidential manner by the public water utility. In the event of a chemical spill, release or related emergency, information pertaining to any spill or release of contaminant shall be immediately disseminated to any emergency responders responding to the site of a spill or release, and the general public shall be promptly notified in the event of a chemical spill, release or related emergency.

(9) If the public water utility's water supply plant is served by a single-source intake to a surface water source of supply or a surface water influenced source of supply, the submitted plan shall also include an examination and analysis of the technical and economic feasibility of each of the following options to provide continued safe and reliable public water service in the event its primary source of supply is detrimentally affected by contamination, release, spill event or other reason:

(A) Constructing or establishing a secondary or backup intake which would draw water supplies from a substantially different location or water source;

(B) Constructing additional raw water storage capacity and/or treated water storage capacity, to provide at least two days of system storage, based on the plant's maximum level of production experienced within the past year;

(C) Creating or constructing interconnections between the public water system with other plants on the public water utility system or another public water system, to allow the public water utility to receive its water from a different source of supply during a period its primary water supply becomes unavailable or unreliable due to contamination, release, spill event or other circumstance;

(D) Any other alternative which is available to the public water utility to secure safe and reliable alternative supplies during a period its primary source of supply is unavailable or negatively impacted for an extended period; and

(E) If one or more alternatives set forth in paragraphs (A) through (D) of this subdivision is determined to be technologically or economically feasible, the public water utility shall submit an analysis of the comparative costs, risks and benefits of implementing each of the described alternatives;

(10) A management plan that identifies specific activities that will be pursued by the public water utility, in cooperation and in concert with the Bureau for Public Health, local health departments, local emergency responders, local emergency planning committee, and other state, county or local agencies and organizations to protect its source water supply from contamination, including, but not limited to, notification to

and coordination with state and local government agencies whenever the use of its water supply is inadvisable or impaired, to conduct periodic surveys of the system, the adoption of best management practices, the purchase of property or development rights, conducting public education or the adoption of other management techniques recommended by the commissioner or included in the source water protection plan;

(11) A communications plan that documents the manner in which the public water utility, working in concert with state and local emergency response agencies, shall notify the local health agencies and the public of the initial spill or contamination event and provide updated information related to any contamination or impairment of the source water supply or the system's drinking water supply, with an initial notification to the public to occur in any event no later than thirty minutes after the public water system becomes aware of the spill, release or potential contamination of the public water system;

(12) A complete and comprehensive list of the potential sources of significant contamination contained within the zone of critical concern, based upon information which is directly provided or can otherwise be requested and obtained from the Department of Environmental Protection, the Bureau for Public Health, the Division of Homeland Security and Emergency Management and other resources; and

(13) An examination of the technical and economic feasibility of implementing an early warning monitoring system.

(c) Any public water utility's public water system with a primary surface water source of supply or a surface water influenced groundwater source of supply that comes into existence on or after the effective date of this article shall submit prior to the commencement of its operations a source water protection plan satisfying the requirements of subsection (b) of this section.

(d) The commissioner shall review a plan submitted pursuant to this section and provide a copy to the Secretary of the Department of Environmental Protection. Thereafter, within one hundred eighty days of receiving a plan for approval, the commissioner may approve, reject or modify the plan as may be necessary and reasonable to satisfy the purposes of this article. The commissioner shall consult with the local public health officer and conduct at least one public hearing when reviewing the plan. Failure by a public water system to comply with a plan approved pursuant to this section is a violation of this article.

(e) The commissioner may request a public water utility to conduct one or more studies to determine the actual risk and consequences related to any potential source of significant contamination identified by the plan, or as otherwise made known to the commissioner.

(f) Any public water utility required to file a complete or updated plan in accordance with the provisions of this section shall submit an updated source water protection plan at least every three years or when there is a substantial change in the potential sources of significant contamination within the identified zone of critical concern.

(g) Any public water utility required to file a complete or updated plan in accordance with the provisions of this section shall review any source water protection plan it may currently have on file with the bureau and update it to ensure it conforms with the requirements of subsection (b) of this section on or before July 1, 2016.

(h) The commissioner's authority in reviewing and monitoring compliance with a source water protection plan may be transferred by the bureau to a nationally accredited local board of public health.

**§16-1-9d. Wellhead and Source Water Protection Grant Program.**

(a) The commissioner shall continue the Wellhead and Source Water Protection Grant Program.

(b) The fund heretofore created to provide funds for the Wellhead and Source Water Protection Grant Program is continued in the State Treasury and shall be known as the Wellhead and Source Water Protection Grant Fund. The fund shall be administered by the commissioner and shall consist of all moneys made available for the program from any source, including but not limited to all [illegible]s, civil penalties and assessed costs, all gifts, grants, bequests or transfers from any source, any moneys that may be appropriated and designated for the program by the Legislature and all interest or other return earned from investment of the fund. Expenditures from the fund shall be for the purposes set forth in this article to provide water source protection pursuant to the program and are not authorized from collections but are to be made only in accordance with appropriation by the Legislature and in accordance with the provisions of article three, chapter twelve of this code and upon the fulfillment of the provisions set forth in article two, chapter eleven-b of this code: *Provided*, That for the fiscal years ending June 30, 2014 and 2015, expenditures are authorized from collections rather than pursuant to an explicit appropriation by the Legislature. Any balance, including accrued interest and other returns, remaining in the fund at the end of each fiscal year shall not revert to the General Revenue Fund but shall remain in the fund and be expended as provided by this section.

(c) In prospectively awarding any grants under the Wellhead and Source Water Protection Grant Program, the commissioner shall prioritize those public water systems where there is the highest probability of contamination of the water source based on the source water assessment report or the source water protection plans which were previously performed. Priority shall also be extended to publicly owned public water systems over privately owned public water systems.

(d) The commissioner, or his or her designee, shall apply for and diligently pursue all available federal funds to help offset the cost of completing source water protection plans by the deadlines established in section nine-c of this article.

(e) The commissioner may receive any gift, federal grant, other grant, donation or bequest and receive income and other funds or appropriations to contribute to the Wellhead and Source Water Protection Plan Grant Program.

**§16-1-9e. Long-term medical study.**

The Bureau for Public Health shall endeavor to engage the Centers for Disease Control and other federal agencies for the purpose of creating, organizing and implementing a medical study to assess any long-term health effects resulting from the chemical spill that occurred on January 9, 2014, and which exposed the public to chemicals, including 4-methylcyclohexane.

The commissioner shall conduct such study pursuant to the authority granted to the commissioner pursuant to article one, section six, chapter sixteen of this code: *Provided*, That in the event the commissioner determines that, in order to adequately perform such study, additional authority is required, the commissioner shall provide a report of such additional authority requested to the Governor and the Joint Committee on Government and Finance.

The commissioner shall cause to be collected and preserved information from health providers who treated patients presenting with symptoms diagnosed as having been caused or exacerbated as a result of exposure related to the January 9, 2014, chemical spill. The commissioner shall analyze such data and other information deemed relevant by the commissioner and provide a report of the commissioner's findings regarding potential long-term health effects of the January 9, 2014, chemical spill to the Joint Committee on Health by January 1, 2015, including the results of its efforts to engage federal cooperation and assistance for a long-term comprehensive study on the costs of conducting such study on behalf of the state.

## CHAPTER 22. ENVIRONMENTAL RESOURCES.

## ARTICLE 26. WATER RESOURCES PROTECTION AND MANAGEMENT ACT.

**§22-26-2. Definitions.**

For purposes of this article:

(1) "Baseline average" means the average amount of water withdrawn by a large-quantity user over a representative historical time period as defined by the secretary.

(2) "Beneficial use" means uses that include, but are not limited to, public or private water supplies, agriculture,

tourism, commercial, industrial, coal, oil and gas and other mineral extraction, preservation of fish and wildlife habitat, maintenance of waste assimilation, recreation, navigation and preservation of cultural values.

(3) "Commercial well" means a well that serves small businesses and facilities in which water is the prime ingredient of the service rendered, including water wells drilled to support horizontal well operations.

(4) "Community water system" means a public water system that pipes water for human consumption to at least fifteen service connections used by year-round residents or one that regularly serves at least twenty-five residents.

(5) "Consumptive withdrawal" means any withdrawal of water which returns less water to the water body than is withdrawn.

(6) "Department" means the West Virginia Department of Environmental Protection.

(7) "Farm use" means irrigation of any land used for general farming, forage, aquaculture, pasture, orchards, nurseries, the provision of water supply for farm animals, poultry farming or any other activity conducted in the course of a farming operation.

(8) "Industrial well" means a well used exclusively for nonpotable purposes, including industrial processing, fire protection, washing, packing or manufacturing of a product excluding food and beverages, or other nonpotable uses.

(9) "Interbasin transfer" means the permanent removal of water from the watershed from which it is withdrawn.

(10) "Large-quantity user" means any person who withdraws over three hundred thousand gallons of water in any thirty-day period from the state's waters and any person who bottles water for resale regardless of quantity withdrawn. "Large-quantity user" excludes farm use, including watering livestock or poultry on a farm, though farms may voluntarily report water withdrawals to assist with the accuracy of the survey.

(11) "Maximum potential" means the maximum designed capacity of a facility to withdraw water under its physical and operational design.

(12) "Noncommunity nontransient water system" means a public water system that serves at least twenty-five of the same persons over six months per year.

(13) "Nonconsumptive withdrawal" means any withdrawal of water which is not a consumptive withdrawal as defined in this section.

(14) "Person", "persons" or "people" means an individual, public and private business or industry, public or private water service and governmental entity.

(15) "Secretary" means the Secretary of the Department of Environmental Protection or his or her designee.

(16) "Transient water system" means a public water system that serves at least twenty-five transient people at least sixty days a year.

(17) "Test well" means a well that is used to obtain information on groundwater quantity, quality, aquifer characteristics and availability of production water supply for manufacturing, commercial and industrial facilities.

(18) "Water resources", "water" or "waters" means any and all water on or beneath the surface of the ground, whether percolating, standing, diffused or flowing, wholly or partially within this state, or bordering this state and within its jurisdiction and includes, without limiting the generality of the foregoing, natural or artificial lakes, rivers, streams, creeks, branches, brooks, ponds, impounding reservoirs, springs, wells, watercourses and wetlands: *Provided,* That farm ponds, industrial settling basins and ponds and waste treatment facilities are excluded from the waters of the state.

(19) "Watershed" means a hydrologic unit utilized by the United States Department of Interior's Geological Survey, adopted in 1974, as a framework for detailed water and related land-resources planning.

(20) "Withdrawal" means the removal or capture of water from water resources of the state regardless of whether it is consumptive or nonconsumptive: *Provided,* That water encountered during coal, oil, gas, water well drilling and initial testing of water wells, or other mineral extraction and diverted, but not used for any purpose and not a factor in low-flow conditions for any surface water or groundwater, is not deemed a withdrawal.

**§22-26-3. Waters claimed by state; water resources protection survey; registration requirements; agency cooperation; information gathering.**

(a) The waters of the State of West Virginia are claimed as valuable public natural resources held by the state for the use and benefit of its citizens. The state shall manage and protect its waters effectively for present and future use and enjoyment and for the protection of the environment. Therefore, it is necessary for the state to determine the nature and extent of its water resources, the quantity of water being withdrawn or otherwise used and the nature of the withdrawals or other uses: *Provided,* That no provisions of this article may be construed to amend or limit any other rights and remedies created by statute or common law in existence on the date of the enactment of this article.

(b) The secretary shall conduct an ongoing water resources survey of consumptive and nonconsumptive surface water and groundwater withdrawals by large-quantity users in this state. The secretary shall determine the form and format of the information submitted, including the use of electronic submissions. The secretary shall establish and maintain a statewide registration program to monitor large-quantity users of water resources.

(c) Large-quantity users, except those who purchase water from a public or private water utility or other service that is reporting its total withdrawal, shall register with the department and provide all requested survey information regarding withdrawals of the water resources. Multiple withdrawals from state water resources that are made or controlled by a single person and used at one facility or location shall be considered a single withdrawal of water. Water withdrawals for self-supplied farm use and private households will be estimated. Water utilities regulated by the Public Service Commission pursuant to article two, chapter twenty-four of this code are exempted from providing information on interbasin transfers to the extent those transfers are necessary to provide water utility services within the state.

(d) Except as provided in subsection (f) of this section, large-quantity users who withdraw water from a West Virginia water resource shall comply with the survey and registration requirements of this article. Registration shall be maintained annually by every large-quantity user on forms and in a manner prescribed by the secretary.

(e) The secretary shall maintain a listing of all large-quantity users and each user's baseline average water withdrawal.

(f) The secretary shall make a good faith effort to obtain survey and registration information from persons who are withdrawing water from in-state water resources, but who are located outside the state borders.

(g) All state agencies and local governmental entities that have a regulatory, research, planning or other function relating to water resources, including, but not limited to, the State Geological and Economic Survey, the Division of Natural Resources, the Public Service Commission, the Bureau for Public Health, the Commissioner of the Department of Agriculture, the Division of Homeland Security and Emergency Management, Marshall University, West Virginia University and regional, county and municipal planning authorities may enter into interagency agreements with the secretary and shall cooperate by: (i) Providing information relating to the water resources of the state; (ii) providing any necessary assistance to the secretary in effectuating the purposes of this article; and (iii) assisting in the development of a state water resources management plan. The secretary shall determine the form and format of the information submitted by these agencies.

(h) Persons required to participate in the survey and registration shall provide any reasonably available information on stream flow conditions that impact withdrawal rates.

(i) Persons required to participate in the survey and registration shall provide the most accurate information available on water withdrawal during seasonal conditions and future potential maximum withdrawals or other information that the secretary determines is necessary for the completion of the survey or registration: *Provided,* That a coal-fired electric generating facility shall also report the nominal design capacity of the facility, which is the quantity of water withdrawn by the facility's intake pumps necessary to operate the facility during a calendar day.

(j) The secretary shall, to the extent reliable water withdrawal data is reasonably available from sources other than persons required to provide data and participate in the survey and registration, utilize that data to fulfill the requirements of this section. If the data is not reasonably available to the secretary, persons required to participate in the survey and registration are required to provide the data. Altering locations of intakes and discharge points that result in an impact to the withdrawal of the water resources shall also be reported.

(k) The secretary shall report annually to the Joint Legislative Oversight Commission on State Water Resources on the survey results. The secretary shall also make a progress report annually on the implementation of the State Water Resources Management Plan and any significant changes that may have occurred since the State Water Resources Management Plan was submitted in 2013.

(l) In addition to any requirements for completion of the survey established by the secretary, the survey must accurately reflect both actual and maximum potential water withdrawal. Actual withdrawal shall be established through metering, measuring or alternative accepted scientific methods to obtain a reasonable estimate or indirect calculation of actual use.

(m) The secretary shall make recommendations to the Joint Legislative Oversight Commission on Water Resources created in section five of this article relating to the implementation of a water quantity management strategy for the state or regions of the state where the quantity of water resources are found to be currently stressed or likely to be stressed due to emerging beneficial or other uses, ecological conditions or other factors requiring the development of a strategy for management of these water resources.

(n) The secretary may propose rules pursuant to article three, chapter twenty-nine-a of this code as necessary to implement the survey registration or plan requirements of this article.

(o) The secretary is authorized to enter into cooperative agreements with local, state and federal agencies and private policy or research groups to obtain federal matching funds, conduct research and analyze survey and registration data and other agreements as may be necessary to carry out his or her duties under this article.

(p) The department, the Division of Natural Resources, the Division of Highways and the Conservation Agency (cooperating state agencies) shall continue providing matching funds for the United States Geological Survey's (USGS) stream-gauging network to the maximum extent practicable. Should a cooperating state agency become unable to maintain its contribution level, it should notify the USGS and the commission of its inability to continue funding for the subsequent federal fiscal year by July 1 in order to allow for the possible identification of alternative funding resources.

**§22-26-5. Joint Legislative Oversight Commission on State Water Resources.**

(a) The President of the Senate and the Speaker of the House of Delegates shall each designate five members of their respective houses, at least one of whom shall be a member of the minority party, to serve on a joint legislative oversight commission charged with immediate and ongoing oversight of the water resources survey, registration and development of a state water resources management plan. This commission shall be known as the Joint Legislative Oversight Commission on State Water Resources and shall regularly investigate and monitor all matters relating to water resources, including the survey and plan.

(b) The expenses of the commission, including the cost of conducting the survey and monitoring any subsequent strategy and those incurred in the employment of legal, technical, investigative, clerical, stenographic, advisory and other personnel, are to be approved by the Joint Committee on Government and Finance and paid from legislative appropriations..

**§22-26-6. Mandatory survey and registration compliance.**

(a) The water resources survey and subsequent registry will provide critical information for protection of the state's water resources and, thus, mandatory compliance with the survey and registry is necessary.

(b) All large-quantity users who withdraw water from a West Virginia water resource shall complete the survey and register use with the department. Any person who fails to complete the survey or register, provides false or misleading information on the survey or registration, or fails to provide other information as required by this article may be subject to a civil administrative penalty not to exceed $5,000 to be collected by the secretary consistent with the secretary's authority pursuant to this chapter. Every thirty days after the initial imposition of the civil administrative penalty, another penalty may be assessed if the information is not provided.

The secretary shall provide written notice of failure to comply with this section thirty days prior to assessing the first administrative penalty.

**§22-26-7. Secretary authorized to log wells; collect data.**

(a) In order to obtain important information about the state's surface and groundwater, the secretary is authorized to collect scientific data on surface and groundwater and to enter into agreements with local and state agencies, the federal government and private entities to obtain this information.

(b) Any person who installs a community water system, noncommunity nontransient water system, transient water system, commercial well, industrial or test well shall notify the secretary of his or her intent to drill a water well no less than ten days prior to commencement of drilling. The ten-day notice is the responsibility of the owner, but may be given by the drilling contractor.

(c) The secretary has the authority to gather data, including driller and geologist logs, run electric and other remote-sensing logs and devices and perform physical characteristics tests on nonresidential and multifamily water wells.

(d) The drilling contractor shall submit to the secretary a copy of the well completion forms submitted to the Bureau for Public Health for a community water system, noncommunity nontransient water system, transient water system, commercial well, industrial or test well. The drilling contractor shall also provide the well GPS location and depth to groundwater on the well report submitted to the secretary.

(e) Any person who fails to notify the secretary prior to drilling a well or impedes collection of information by the secretary under this section is in violation of the Water Resources Protection and Management Act and is subject to the civil administrative penalty authorized by section six of this article.

(f) Any well contracted for construction by the secretary for groundwater or geological testing must be constructed at a minimum to well design standards as promulgated by the Bureau for Public Health. Any wells contracted for construction by the secretary for groundwater or geological testing that would at a later date be converted to a public use water well must be constructed to comport to state public water design standards.

**§22-26-8. State Water Resources Management Plan; powers and duty of secretary.**

(a) The secretary shall oversee the development of a State Water Resources Management Plan to be completed no later than November 30, 2013. The plan shall be reviewed and revised as needed after its initial adoption. The plan shall be developed with the cooperation and involvement of local and state agencies with regulatory, research or other functions relating to water resources including, but not limited to, those agencies and institutions of higher education set forth in section three of this article and a representative of large-quantity users. The State Water Resources Management Plan shall be developed utilizing the information obtained pursuant to said section and any other relevant information available to the secretary.

(b) The secretary shall develop definitions for use in the State Water Resources Management Plan for terms that are defined differently by various state and federal governmental entities as well as other terms necessary for implementation of this article.

(c) The secretary shall continue to develop and obtain the following:

(1) An inventory of the surface water resources of each region of this state, including an identification of the boundaries of significant watersheds and an estimate of the safe yield of sources for consumptive and nonconsumptive uses during periods of normal conditions and drought.

(2) A listing of each consumptive or nonconsumptive withdrawal by a large-quantity user, including the amount of water used, location of the water resources, the nature of the use, location of each intake and discharge point by longitude and latitude where available and, if the use involves more than one watershed or basin, the watersheds or basins involved and the amount transferred.

(3) A plan for the development of the infrastructure necessary to identify the groundwater resources of each region of this state, including an identification of aquifers and groundwater basins and an assessment of their safe yield, prime recharge areas, recharge capacity, consumptive limits and relationship to stream base flows.

(4) After consulting with the appropriate state and federal agencies, assess and project the existing and future nonconsumptive use needs of the water resources required to serve areas with important or unique natural, scenic, environmental or recreational values of national, regional, local or statewide significance, including national and state parks; designated wild, scenic and recreational rivers; national and state wildlife refuges; and the habitats of federal and state endangered or threatened species.

(5) Assessment and projection of existing and future consumptive use demands.

(6) Identification of potential problems with water availability or conflicts among water uses and users including, but not limited to, the following:

(A) A discussion of any area of concern regarding historical or current conditions that indicate a low-flow condition or where a drought or flood has occurred or is likely to occur that threatens the beneficial use of the surface water or groundwater in the area; and

(B) Current or potential in-stream or off-stream uses that contribute to or are likely to exacerbate natural low-flow conditions to the detriment of the water resources.

(7) Establish criteria for designation of critical water planning areas comprising any significant hydrologic unit where existing or future demands exceed or threaten to exceed the safe yield of available water resources.

(8) An assessment of the current and future capabilities of public water supply agencies and private water supply companies to provide an adequate quantity and quality of water to their service areas.

(9) An assessment of floodplain and stormwater management problems.

(10) Efforts to improve data collection, reporting and water monitoring where prior reports have found deficiencies.

(11) A process for identifying projects and practices that are being, or have been, implemented by water users that reduce the amount of consumptive use, improve efficiency in water use, provide for reuse and recycling of water, increase the supply or storage of water or preserve or increase

groundwater recharge and a recommended process for providing appropriate positive recognition of those projects or practices in actions, programs, policies, projects or management activities.

(12) An assessment of both structural and nonstructural alternatives to address identified water availability problems, adverse impacts on water uses or conflicts between water users, including potential actions to develop additional or alternative supplies, conservation measures and management techniques.

(13) A review and evaluation of statutes, rules, policies and institutional arrangements for the development, conservation, distribution and emergency management of water resources.

(14) A review and evaluation of water resources management alternatives and recommended programs, policies, institutional arrangements, projects and other provisions to meet the water resources needs of each region and of this state.

(15) Proposed methods of implementing various recommended actions, programs, policies, projects or management activities.

(d) The State Water Resources Management Plan shall consider:

(1) The interconnections and relationships between groundwater and surface water as components of a single hydrologic resource.

(2) Regional or watershed water resources needs, objectives and priorities.

(3) Federal, state and interstate water resource policies, plans, objectives and priorities, including those identified in statutes, rules, regulations, compacts, interstate agreements or comprehensive plans adopted by federal and state agencies and compact basin commissions.

(4) The needs and priorities reflected in comprehensive plans and zoning ordinances adopted by a county or municipal government.

(5) The water quantity and quality necessary to support reasonable and beneficial uses.

(6) A balancing and encouragement of multiple uses of water resources, recognizing that all water resources of this state are capable of serving multiple uses and human needs, including multiple uses of water resources for reasonable and beneficial uses.

(7) The distinctions between short-term and long-term conditions, impacts, needs and solutions to ensure appropriate and cost-effective responses to water resources issues.

(8) Application of the principle of equal and uniform treatment of all water users that are similarly situated without regard to established political boundaries.

(e) Each November, the secretary shall report to the Joint Legislative Oversight Commission on State Water Resources on the implementation of the State Water Resources Management Plan.

(f) The State Water Resources Management Plan is adopted. Persons identified as large-quantity users prior to the effective date of this subsection shall report actual monthly water withdrawals, or monthly water withdrawals by a method approved by the secretary, for the previous calendar year by March 31 of each succeeding year. Persons identified as large-quantity users on or after the effective date of this subsection shall submit their initial annual report no later than March 31, 2016, and subsequent annual reports by March 31 of each year thereafter.

## ARTICLE 30. THE ABOVEGROUND STORAGE TANK ACT.

### §22-30-1. Short title.

This article may be known and cited as the Aboveground Storage Tank Act.

### §22-30-2. Legislative findings.

(a) The West Virginia Legislature finds the public policy of the State of West Virginia is to protect and conserve the water resources for the state and its citizens. The state's water resources are vital natural resources that are essential to maintain, preserve and promote human health, quality of life and economic vitality of the state.

(b) The West Virginia Legislature further finds the public policy of the state is for clean, uncontaminated water to be made available for its citizens who are dependent on clean water as a basic need for survival, and who rely on the assurances from public water systems and the government that the water is safe to consume.

(c) The West Virginia Legislature further finds it in the public policy of the state that clean, uncontaminated water be available to its businesses and industries that rely on water for their economic survival, and the well-being of their employees. These include hospitals and the medical industry, schools and educational institutions, the food and hospitality industries, the tourism industry, manufacturing, coal, natural gas and other industries. Businesses and industries searching for places to locate or relocate consider the quality of life for their employees as well as the quality of the raw materials such as clean water.

(d) The Legislature further finds that large quantities of fluids are stored in aboveground storage tanks within the state and that emergency situations involving these fluids can and will arise that may present a hazard to human health, safety, the water resources, the environment and the economy of the state. The Legislature further recognizes that some of these fluids have been stored in aboveground storage tanks in a regulated manner insufficient to protect human health, safety, water resources, the environment and the economy of the state.

**§22-30-3. Definitions.**

For purposes of this article:

(1) "Aboveground storage tank" or "tank" means a device made to contain an accumulation of more than one thousand three hundred twenty gallons of fluids that are liquids at standard temperature and pressure, which is constructed primarily of noncarbon materials, including wood, concrete, steel, plastic or fiberglass reinforced plastic, which provide structural support, more than ninety percent capacity of which is above the surface of the ground, but does not include any process vessel. The term includes stationary devices which are permanently affixed, and mobile devices which remain in one location on a continuous basis for sixty or more days, and includes all ancillary aboveground pipes and dispensing systems up to the first point of isolation and all ancillary underground pipes and dispensing systems

connected to the aboveground containers to the first point of isolation. Notwithstanding any other provision of this code to the contrary, shipping containers, including railroad freight cars, subject to federal regulation under the Federal Railroad Safety Act, 49 U. S. C. §§20101-2015, as amended, including, but not limited to, federal regulations promulgated thereunder at 49 CFR 172, 173 or 174, or subject to other federal law governing the transportation of hazardous materials are not subject to any provision of this article or of article thirty-one of this chapter. Notwithstanding any other provision of this code to the contrary, barges or boats subject to federal regulation under the United States Coast Guard, United States Department of Homeland Security, including but not limited to federal regulations promulgated at 33 CFR 1, et seq, or subject to other federal law governing the transportation of hazardous materials are not subject to any provision of this article or of article thirty-one of this chapter. Notwithstanding any other provision of this code to the contrary, swimming pools are not subject to any provision of this article or article thirty-one of this chapter.

(2) "Department" means the West Virginia Department of Environmental Protection.

(3) "Nonoperational storage tank" means an empty aboveground storage tank in which fluids will not be deposited or from which fluids will not be dispensed on or after the effective date of this article.

(4) "Operator" means any person in control of, or having responsibility for, the daily operation of an aboveground storage tank.

(5) "Owner" means a person who holds title to, controls or owns an interest in an aboveground storage tank, including owners of tanks immediately preceding the discontinuation of

a tank's use. "Owner" does not mean a person who holds an interest in a tank for financial security, unless the holder has taken possession of and operated the tank.

(6) "Person", "persons" or "people" means any individual, trust, firm, owner, operator, corporation or other legal entity, including the United States government, an interstate commission or other body, the state or any agency, board, bureau, office, department or political subdivision of the state, but does not include the Department of Environmental Protection.

(7) "Process vessel" means tanks, containers or other vessels utilized in a facility in the manufacturing process through which there is a steady, variable, recurring or intermittent flow of materials. This does not include tanks used for storage of materials prior to their introduction into the production process or for the storage of finished products or by-products of the production process.

(8) "Public groundwater supply source" means a primary source of water supply for a public water system which is directly drawn from a well, underground stream, underground reservoir, underground mine or other primary source of water supplies which is found underneath the surface of the state.

(9) "Public surface water supply source" means a primary source of water supply for a public water system which is directly drawn from rivers, streams, lakes, ponds, impoundments or other primary sources of water supplies which are found on the surface of the state.

(10) "Public surface water influenced groundwater supply source" means a source of water supply from a public water system which is directly drawn from an underground well, underground river or stream, underground reservoir or

underground mine, and the quantity or quality of the water in that underground supply source is heavily influenced, directly or indirectly, by the quantity and quality of surface water in the immediate area.

(11) "Public water system" means:

(A) Any water supply or system which regularly supplies or offers to supply water for human consumption through pipes or other constructed conveyances, if serving at least an average of twenty-five individuals per day for at least sixty days per year, or which has at least fifteen service connections, and shall include:

(i) Any collection, treatment, storage and distribution facilities under the control of the owner or operator of the system and used primarily in connection with the system; and

(ii) Any collection or pretreatment storage facilities not under such control which are used primarily in connection with the system.

(B) A public water system does not include a system which meets all of the following conditions:

(i) Consists only of distribution and storage facilities and does not have any collection and treatment facilities;

(ii) Obtains all of its water from, but is not owned or operated by, a public water system which otherwise meets the definition;

(iii) Does not sell water to any person; and

(iv) Is not a carrier conveying passengers in interstate commerce.

(12) "Release" means any spilling, leaking, emitting, discharging, escaping, leaching or disposing of fluids from an aboveground storage tank into groundwater, surface water or subsurface soils. The term shall also include spilling, leaking, emitting, discharging, escaping, leaching or disposing of fluids from an aboveground storage tank into a containment structure or facility that poses an immediate threat of contamination of the soils, subsurface soils, surface water or groundwater: *Provided*, That the overfill or spillage of up to twenty gallons of fluid during the loading or unloading of liquids shall not be required to be reported if the overflow or spillage is wholly contained within a containment structure or facility, it is promptly cleaned up and no portion of the overfill or spillage escapes onto the ground or into adjacent surface water.

(13) "Secondary containment" means a safeguard applied to one or more tanks that prevents the discharge into the waters of the state of the entire capacity of the largest single tank and sufficient freeboard to contain precipitation. In order to qualify as secondary containment, the barrier and containment field must be sufficiently impervious to contain fluids in the event of a release, and may include double-walled tanks, dikes, containment curbs, pits or drainage trench enclosures that safely confine the release from a tank in a facility catchment basin or holding pond.

(14) "Secretary" means the Secretary of the Department of Environmental Protection, or his or her designee.

(15) "Source water protection area" for a public groundwater supply source is the area within an aquifer that supplies water to a public water supply well within a five-year time-of-travel, and is determined by the mathematical calculation of the locations from which a drop of water placed at the edge of the protection area would theoretically take five years to reach the well.

(16) "Zone of critical concern" for a public surface water supply is a corridor along streams within a watershed that warrants more detailed scrutiny due to its proximity to the surface water intake and the intake's susceptibility to potential contaminants within that corridor. The zone of critical concern is determined using a mathematical model that accounts for stream flows, gradient and area topography. The length of the zone of critical concern is based on a five-hour time-of-travel of water in the streams to the water intake, plus an additional one-fourth mile below the water intake. The width of the zone of critical concern is one thousand feet measured horizontally from each bank of the principal stream and five hundred feet measured horizontally from each bank of the tributaries draining into the principal stream.

**§22-30-4. Inventory and registration of existing aboveground storage tanks.**

(a) To assure protection of the water resources of the state, the secretary shall compile an inventory of all aboveground storage tanks in existence this state, regardless of whether it is an operational or nonoperational storage tank on the effective date of this article. The secretary shall prescribe an inventory and registration form for this purpose within thirty days of the effective date of the enactment of this article.

(b) At a minimum the inventory form shall identify the ownership of the tank, tank location, date of installation if known, type of construction, capacity and age of the tank, the type and volume of fluid stored therein, and the identity of and distance to the nearest groundwater public water supply intake and/or nearest surface water downstream public water supply intake.

(c) If the inventoried tank is regulated under any existing state or federal regulatory program, the owner of the tank shall be required to provide the identifying number of any license, registration or permit issued for the tank, and identify the regulatory standards and requirements the tank is required to meet.

(d) Any aboveground storage tank placed into service on or after the effective date of this section, but prior to the establishment of a permit program, shall complete and submit an inventory form with the secretary.

(e) Upon receipt of an inventory form, the secretary shall determine whether the storage tank is required to meet the minimum design, construction, inspection, secondary containment, leak reporting and performance standards equivalent to or greater than the standards and requirements established under an existing license or permit issued for the individual storage tank, storage tank farm or site on which the storage tank is located.

(f) The secretary may charge a reasonable fee to cover the cost of maintaining and overseeing the inventory and registration program. The fee may be set by emergency and legislative rules proposed for promulgation in accordance with the provisions of article three, chapter twenty-nine-a of this code.

(g) On and after October 1, 2014, it shall be unlawful for any owner or operator to operate or use an aboveground storage tank subject to this article which has not been properly registered or for which any applicable registration fee has not been paid.

**§22-30-5. Aboveground Storage Tank Regulatory Program; promulgation of appropriate aboveground tank**

**standards; permitting procedures and waiver requirements; rulemaking requirements.**

(a) The secretary shall promulgate for review and consideration by the West Virginia Legislature legislative rules during the 2015 Regular Session of the West Virginia Legislature, on all matters related to this article.

(b) To assure further protection of the water resources of the state, the secretary shall develop a regulatory program for new and existing aboveground storage tanks incorporating nationally recognized tank standards such as those standards developed by the American Petroleum Institute (API), the Steel Tank Institute (STI) or comparable authorities, and taking into account the size, location and contents of the tanks. At a minimum, the program shall include the following:

(1) A requirement to submit a verified application for a permit containing information as may be prescribed by the secretary;

(2) Performance standards for design, construction, installation, maintenance, corrosion detection and maintenance, release detection and prevention and secondary containment to ensure the structural integrity of the storage tank and the secondary containment;

(3) Requirements for maintaining a leak detection system, inventory control systems together with tank testing or a comparable system or method designed to identify releases from aboveground storage tanks in a manner consistent with the protection of human health, safety, water resources and the environment;

(4) Requirements for maintaining records of any monitoring or leak detection system, corrosion prevention, inventory control system or tank testing system;

(5) Requirements for early detection of releases and immediate reporting of releases;

(6) Requirements for developing a corrective action plan to expeditiously respond to any releases;

(7) Requirements for the closure of aboveground storage tanks and remediation to prevent future releases of fluids or materials to the state's water resources;

(8) Requirements for certification of installation, removal, retrofit, corrosion and other testing and inspection of aboveground storage tanks, leak detection systems and secondary containment by a qualified registered professional engineer regulated and licensed by the State Board of Registration for Professional Engineers, or by an individual certified to perform tank inspections by the American Petroleum Institute, or by a person holding certification under another program approved by the secretary;

(9) Requirements for life-cycle management of aboveground storage tanks that include mitigation and corrosion prevention plans that include, but are not limited to:

(A) A life-cycle maintenance schedule for the use of protective coatings and or other repair, rehabilitation, and maintenance methods used for the preservation of aboveground storage tanks;

(B) A process for ensuring that corrosion prevention and mitigation is carried out according to corrosion prevention industry standards adopted by the secretary for aboveground storage tanks that includes the use of industry trained and certified:

(i) Protective coatings personnel to carry out surface preparation operations and coating application on any type of substrate and or surface, but especially concrete and steel;

(ii) Cathodic protection experts for all aspects of corrosion prevention projects requiring knowledge of the design, installation, monitoring or maintenance of a cathodic protection system; and

(iii) Inspectors to ensure best practices and standards are adhered to on a corrosion prevention and mitigation project;

(C) A plan to prevent environmental degradation that could occur as a result of carrying out corrosion prevention and mitigation including, but not limited to, the careful handling and containment of hazardous materials, not including the contaminant within, removed from the interior and or exterior of an aboveground storage tank; and

(D) Use of industry experts for consultation and direct to determine whether to approve a corrosion prevention and mitigation plan, or any part therein, the secretary shall consult, and interact directly with, corrosion industry experts specializing in the training and certification of personnel to carry out corrosion prevention and mitigation methods.

(10) The assessment of permit application and registration fees as determined by the secretary;

(11) Permit issuance only after the application and any other supporting documents have been submitted, reviewed

and approved by the secretary, and that permits may be issued with certain conditions or contingencies;

(12) A requirement that any aboveground storage tank maintenance work shall commence within six months from the date the permit was issued and must be completed within one year of commencement. If the work has not started or is not completed during the stated time periods, the permit shall expire and a new permit shall be required unless a written extension is granted by the secretary. An extension may be granted only if the applicant can demonstrate that the delay was not deliberate and that the delay will not present harm to human health, safety, water resources or the environment;

(13) A procedure for the administrative resolution of violations including the assessment of administrative civil penalties;

(14) A procedure for any person adversely affected by a decision or order of the secretary relating to the aboveground storage tank program to appeal to the Environmental Quality Board, pursuant to the provisions of article one, chapter twenty-two-b of this code;

(15) In coordination and cooperation with the Bureau for Public Health and the Division of Homeland Security and Emergency Management, create a process and procedure for identifying any aboveground storage tanks which are located within a defined zone of critical concern for a public water system's surface water intake or within a defined source water protection area for a public water system's groundwater intake, and determining whether additional permit requirements and inspections should be imposed on that tank or facility by requiring the issuance of any new permit pursuant to this article, or by amending any existing permit

which may pertain to that tank or facility, under this chapter, or by any other article of this chapter;

(16) Requirements for maintaining written or electronic records that log at least the following information for each aboveground storage tank: Tank numbers, additives, verifiable content levels, deliveries, amounts and quantities, dispensing, repairs and maintenance; and including the requirement that such logs be signed by the owner or a designated responsible supervisor, and be available for inspection upon request of the secretary; and

(17) Compliance with a nationally recognized tank standard as solely determined by the department, shall be deemed compliance with the requirements that are developed in accordance with subsection (9) of this section.

**§22-30-6. Annual inspection and certification.**

(a) Every owner or operator of an aboveground storage tank regulated herein shall have an annual inspection of each tank performed by a qualified registered professional engineer or a qualified person working under the direct supervision of a registered professional engineer, regulated and licensed by the State Board of Registration for Professional Engineers, or by an individual certified to perform tank inspections by the American Petroleum Institute, or by a person holding certification under another program approved by the secretary. Every owner or operator shall submit, on a form prescribed by the secretary, a certification from the engineer that each tank, associated equipment, leak detection system and secondary containment structure meets the minimum standards established by this article or by the secretary by rule.

(b) The certification form shall be submitted to the secretary on or before January 1, 2015, and each year thereafter.

**§22-30-7. Financial responsibility.**

The secretary shall promulgate rules requiring owners and operators to provide evidence of adequate financial resources to undertake reasonable corrective action for releases of fluid from aboveground storage tanks. The means of demonstrating adequate financial responsibility may include, but not be limited to, providing evidence of current insurance, guarantee, surety bond, letter of credit, proof of assets, trust fund or qualification as a self insurer.

**§22-30-8. Corrective action.**

(a) Prior to the effective date of the emergency and legislative rules promulgated pursuant to the authority granted under this article, the secretary is authorized to:

(1) Require the owner or operator to develop a preliminary corrective action plan taking into consideration the types of fluids and types of tanks on the premises;

(2) Require the owner or operator of an aboveground storage tank to undertake prompt corrective action to protect human health, safety, water resources or the environment from contamination caused by a release; or

(3) Undertake immediate corrective action with respect to any release or threatened release of fluid from an aboveground storage tank when, in the judgment of the secretary, the action is necessary to protect human health, safety, water resources or the environment from contamination caused by a release.

(b) The corrective action undertaken or required by this section shall be what may be necessary to protect human health, water resources and the environment from contamination caused by a release, including the ordered cessation or closure of a source of contamination and the ordered remediation of a contaminated site. The secretary shall use funds in the Protect Our Water Fund established pursuant to this article for payment of costs incurred for corrective action taken by the secretary in accordance with this article. In undertaking corrective actions under this section and in issuing orders requiring owners or operators to undertake the actions, the secretary shall give priority to releases or threatened releases of fluid from aboveground storage tanks that pose the greatest threat to human health, water resources or the environment.

(c) Following the effective date of rules promulgated pursuant to this article, all actions or orders of the secretary shall be in conformity with those rules. Following the effective date of the rules, the secretary may undertake corrective action with respect to any release or threatened release of fluid from an aboveground storage tank only if, in the judgment of the secretary, the action is necessary to protect human health, safety, water resources or the environment from contamination, and one or more of the following situations exists:

(1) If no person can be found within thirty days, or a shorter period as may be necessary to protect human health, safety, water resources and the environment, who is an owner or operator of the aboveground storage tank at issue and who is capable of carrying out the corrective action properly;

(2) A situation exists that requires immediate action by the secretary under this section to protect human health, safety, water resources or the environment;

(3) The cost of corrective action to be expended on an aboveground storage tank exceeds the amount of resources that the owner or operator can reasonably be expected to possess based on the information required to be submitted pursuant to this article and, considering the fluid being stored in the aboveground storage tank in question, expenditures from the Protect Our Water Fund are necessary to assure an effective corrective action; or

(4) The owner or operator of the tank has failed or refused to comply with an order of the secretary under this article or of the Environmental Quality Board under article one, chapter twenty-two-b of this code to comply with appropriate corrective action measures ordered by the secretary or the Environmental Quality Board.

(d) The secretary may draw upon the Protect Our Water Fund in order to take action under subdivision (1) or (2), subsection (c) of this section if the secretary has made diligent good-faith efforts to determine the identity of the owner or operator responsible for the release or threatened release and:

(1) The secretary is unable to determine the identity of the owner or operator in a manner consistent with the need to take timely corrective action; or

(2) The owner or operator determined by the secretary to be responsible for the release or threatened release has been informed in writing of the secretary's determination and has been requested by the secretary to take appropriate corrective action but is unable or unwilling to take proper action in a timely manner.

(e) The written notice to the owner or operator must inform the owner or operator that if it is subsequently found liable for releases pursuant to this section, the owner or operator will be required to reimburse the Protect Our Water Fund for the costs of the investigation, information gathering and corrective action taken by the secretary.

(f) If the secretary determines that immediate response to an imminent threat to human health, safety, water resources or the environment is necessary to avoid substantial injury or damage thereto, corrective action may be taken pursuant to this section without the prior written notice required by subdivision (2), subsection (d) of this section. In that case, the secretary must give subsequent written notice to the owner or operator within fifteen days after the action is taken describing the circumstances that required the action to be taken and setting forth the matters identified in subsection (e) of this section.

**§22-30-9. Spill prevention response plan.**

(a) Within one hundred eighty days of the effective date of this article, each owner or operator of an aboveground storage tank shall submit a spill prevention response plan for each aboveground storage tank. Owners and operators of aboveground storage tanks shall file updated plans required to be submitted by this section no less frequently than every three years. Each plan shall be site-specific, consistent with the requirements of this article, and developed in consultation with Bureau for Public Health, county and municipal emergency management agencies. The spill prevention response plan shall at a minimum:

(1) Identify and describe the activity that occurs at the site and identify applicable hazard and process information, including a specific listing and inventory of all types of fluids stored, amount of fluids stored and wastes generated that are stored in aboveground storage tanks at the facility. The plan

shall include the material safety data sheets (MSDS) required by the Occupational Safety and Health Administration for all fluids in use or stored in aboveground storage tanks at the facility. The material safety data sheets must include the health hazard number identified by the National Fire Protection Association. The plan shall also include drawings of the aboveground storage tank facility, including the locations of all drainage pipes and water outlets;

(2) Identify all facility-related positions with duties and responsibilities for developing, implementing and maintaining the facility's plan. The plan shall describe in detail the chain of command at the aboveground storage tank facility and list all facility emergency coordinators and all known emergency response contractors;

(3) Provide a preventive maintenance program that includes monitoring and inspection procedures, including identification of stress points, employee training programs and security systems. The plan shall include a description of potential sources and areas where spills and leaks may occur by drawings and plot plans and shall identify specific spill prevention measures for those identified areas;

(4) Detail the specific response that the aboveground storage tank facility and contract emergency personnel shall take upon the occurrence of any release of fluids from an aboveground storage tank at the facility;

(5) Provide contact information obtained by the owner or operator of the aboveground storage tanks from the county and municipal emergency management agencies and the nearest downstream public water supply intake, and designate the person or persons to be notified in the event of a release from an aboveground storage tank; and

(6) Provide the secretary with all other requested information.

(b) Each owner of an aboveground storage tank with an approved spill prevention response plan shall submit to the secretary a revised plan or addendum to the plan in accordance with the requirements of this article if any of the following occur:

(1) There is a substantial modification in design, construction, operation or maintenance of any aboveground storage tank or associated equipment, or there are other circumstances that increase the potential for fires, explosions or releases of fluids;

(2) There is a substantial modification in emergency equipment at the facility;

(3) There are substantial changes in emergency response protocols at the aboveground storage tank facility;

(4) The plan fails in an emergency;

(5) The removal or the addition of any aboveground storage tank; or

(6) Other circumstances occur about which the secretary requests an update.

(c) The secretary shall approve the spill prevention response plan or reject the plan and require modifications as may be necessary and reasonable to assure the protection of the source water of a public water system from a release of fluids from an aboveground storage tank. If rejected, the owner of the aboveground storage tank shall submit a revised plan to the secretary for approval within thirty days of receipt of notification of the secretary's decision. Failure to comply with a plan approved by the secretary pursuant to this section is a violation of this article.

(d) Nothing contained in this section relieves the owner or operator of an aboveground storage tank from his or her obligation to report any release immediately to the department's emergency notification telephone number.

**§22-30-10. Notice to local governments and water companies.**

The owner or operator of an aboveground storage tank facility shall provide as required by the secretary public notice to any public water system where the facility is located within the system's identified groundwater supply's source water protection area or within the system's surface water supply's zone of critical protection, to the local municipality, if any, and to the county in which the facility is located. The notice shall provide a detailed inventory of the type and quantity of fluid stored in aboveground storage tanks at the facility and the material safety data sheets (MSDS) associated with the fluid in storage. The owner or operator shall also provide as required by the secretary a copy of the spill prevention response plan and any updates thereto, which have been approved by the secretary pursuant to this act, to the applicable public water systems and county and municipal emergency management agencies.

**§22-30-11. Required signage.**

Every aboveground storage tank shall display the signage, if any, required by the Occupational Safety and Health Administration; the tank registration number, when issued by the secretary; and the emergency contact number for the owner or operator of the tank and the emergency contact number for the Department of Environmental

Protection's Spill Reporting Hotline. For the purposes of this section, the requirements for prominently posted signage shall be specified in the rules proposed for promulgation by the secretary pursuant to this article and article three, chapter twenty-nine-a of this code.

**§22-30-12. Aboveground Storage Tank Administrative Fund.**

(a) The secretary shall collect annual registration fees from owners or operators of each aboveground storage tank in an amount to be promulgated in the legislative rules authorized by this article to be used by the secretary to defray the costs of administering this article. All registration and permit fees and the net proceeds of all fines, penalties and forfeitures collected under this article, including accrued interest, shall be paid into a special revenue account, hereby created within the State Treasury, designated the Aboveground Storage Tank Administrative Fund.

(b) At the end of each fiscal year, any unexpended balance, including accrued interest, on deposit in the Aboveground Storage Tank Administrative Fund shall not be transferred to the General Revenue Fund, but shall remain in the Aboveground Storage Tank Administrative Fund for expenditure pursuant to this section.

**§22-30-13. Protect Our Water Fund.**

(a) Each owner or operator of an aboveground storage tank located in this state shall pay an annual fee to establish a fund to assure adequate response to leaking aboveground storage tanks. The amount of fees assessed pursuant to this section shall be set forth by rule. The fees must be sufficient to cover the regulatory oversight and services to be provided by designated agencies, including necessary technical and administrative personnel. The proceeds of the assessment shall be paid into a special revenue account, hereby created within the State Treasury, designated the Protect Our Water Fund. The fund shall be administered by the secretary. Expenditures from the fund shall be solely to respond to leaking aboveground storage tanks, and are not authorized from collections but are to be made only in accordance with appropriation by the Legislature and in accordance with the provisions of article three, chapter twelve of this code and upon the fulfillment of the provisions set forth in article two, chapter eleven-b of this code: *Provided*, That for the fiscal years ending June 30, 2014 and 2015, expenditures are authorized from collections rather than pursuant to an explicit appropriation by the Legislature. At the end of each fiscal year, any unexpended balance, including accrued interest, on deposit in the Protect Our Water Fund shall not be transferred to the General Revenue Fund, but shall remain in the Protect Our Water Fund for expenditure pursuant to this section.

(b) Each owner or operator of an aboveground storage tank subject to a fee assessment under subsection (a) of this section shall pay a fee based on the number of aboveground storage tanks he or she owns or operates, as applicable. The secretary shall vary the fees annually to a level necessary to produce a sufficient fund at the beginning of each calendar year.

(c) At the end of each fiscal year, any unexpended balance, including accrued interest, on deposit in the Protect Our Water Fund shall not be transferred to the General Revenue Fund, but shall remain in the Protect Our Water Fund.

(d) The secretary may enter into agreements and contracts and to expend the moneys in the fund for the following purposes:

(1) Responding to aboveground storage tank releases when, based on readily available information, the secretary determines that immediate action is necessary to prevent or mitigate significant risk of harm to human health, safety, water resources or the environment from contamination caused by a release of fluid from aboveground storage tanks in situations for which no federal funds are immediately available for the response, cleanup or containment: *Provided*, That the secretary shall apply for and diligently pursue all available federal funds at the earliest possible time;

(2) Reimbursing any nonresponsible parties for reasonable cleanup costs incurred with the authorization of the secretary in responding to an aboveground storage tank release; or

(3) Reimbursing any nonresponsible parties for reasonable costs incurred with the authorization of the secretary responding to perceived, potential or threatened releases from aboveground storage tanks.

(e) The secretary, through a cooperative agreement with another state regulatory agency, in this or another state, may use the fund to compensate the cooperating agency for expenses the cooperating agency incurs in carrying out regulatory responsibilities that agency may have pursuant to this article.

**§22-30-14. Public access to information.**

(a) The public shall have access to all documents and information submitted to the agency, subject to the limitations contained in the state Freedom of Information Act, article one, chapter twenty-nine-b of this code. Records, reports or information obtained from any persons under this article may be disclosed to other officers, employees or authorized representatives of this state or federal agency implementing the provisions of this article or any other applicable law related to releases of fluid from aboveground storage tanks that impact the state's water resources.

(b) A list of the potential sources of significant contamination contained within the zone of critical concern as provided by the Department of Environmental Protection, the Bureau for Public Health and the Division of Homeland Security and Emergency Management may be disclosed. The exact location of the contaminants within the zone of critical concern is not subject to public disclosure in response to a Freedom of Information Act request under article one, chapter twenty-nine-b of this code. However, the location, characteristics and approximate quantities of potential sources of significant contamination within the zone of critical concern shall be made known to one or more designees of the public water utility, and shall be maintained in a confidential manner by the public water utility. In the event of a chemical spill, release or related emergency, information pertaining to any spill or release of contaminant shall be immediately disseminated to any emergency responders responding to the site of a spill or release, and the general public shall be promptly notified in the event of a chemical spill, release or related emergency.

**§22-30-15. Inspections, monitoring and testing.**

(a) For the purposes of developing or assisting in the development of any rule, conducting any study, taking any corrective action or enforcing any provision of this article, any owner or operator of an aboveground storage tank shall, upon request of the secretary:

(1) Furnish information relating to the aboveground storage tanks, their associated equipment and contents;

(2) Conduct reasonable monitoring or testing;

(3) Permit the secretary, at all reasonable times, to inspect and copy records relating to aboveground storage tanks; and

(4) Permit the secretary to have access to the aboveground storage tanks for corrective action.

(b) For the purposes of developing or assisting in the development of any rule, conducting any study, taking corrective action or enforcing any provision of this article, the secretary may:

(1) Enter at any time any establishment or other place where an aboveground storage tank is located;

(2) Inspect and obtain samples of any fluid contained in an aboveground storage tank from any person;

(3) Conduct monitoring or testing of the aboveground storage tanks, associated equipment, contents or surrounding soils, surface water or groundwater; and

(4) Take corrective action as specified in this article.

(c) Each inspection shall be commenced and completed with reasonable promptness.

(d) To ensure protection of the water resources of the state and compliance with any provision of this article or rule promulgated thereunder, the secretary shall inspect at least annually any aboveground storage tank facility located within the zone of critical concern of a public water system with a public surface water supply source or a public surface water influenced groundwater supply source.

**§22-30-16. Administrative orders; injunctive relief.**

(a) When the secretary determines, on the basis of any information, that a person is in violation of any requirement of this article or the rules promulgated thereunder, the secretary may issue an order stating with reasonable specificity the nature of the violation and requiring compliance within a reasonable specified time period, or the secretary may commence a civil action in the circuit court of the county in which the violation occurred or in the circuit court of Kanawha County for appropriate relief, including a temporary or permanent injunction. The secretary may, except as provided in subsection (b) of this section, stay any order he or she issues upon application, until the order is reviewed by the Environmental Quality Board.

(b) In addition to the powers and authority granted to secretary by this chapter to enter into consent agreemen settlements, and otherwise enforce this chapter, the secretary shall propose rules for legislative approval to establish a mechanism for the administrative resolution of violations set forth in this article through consent order or agreement as an alternative to instituting a civil action.

**§22-30-17. Civil and criminal penalties.**

(a) Any person who fails to comply with an order of the secretary issued under subsection (a), section sixteen of this article within the time specified in the order is liable for a civil penalty of not more than $25,000 for each day of continued noncompliance.

(b) Any owner or operator of an aboveground storage tank who knowingly fails to register or obtain a permit required by this article for an aboveground storage tank or submits false information pursuant to this article is liable for a civil penalty not to exceed $10,000 for each aboveground storage tank that is not registered or permitted or for which false information is submitted.

(c) Any owner or operator of an aboveground storage tank who fails to comply with any requirement of this article or any standard promulgated by the secretary pursuant to this article is subject to a civil penalty not to exceed $10,000 for each day of violation.

(d) Any person who knowingly and intentionally violates any provision of this article shall be guilty of a misdemeanor, and, upon conviction thereof, shall be confined in a regional jail for a period of time not exceeding one year, and be fined an amount not to exceed $25,000.

(e) Any person convicted of a second or subsequent willful violation of subsection (d) of this section or knowingly and willfully violates any provision of any permit, rule or order issued under or subject to the provisions of this article is guilty of a felony and, upon conviction, shall be imprisoned in a correctional facility not less than one nor more than three years, or fined not more than $50,000 for each day of violation, or both fined and imprisoned.

(f) Any person may be prosecuted and convicted under the provisions of this section notwithstanding that none of the administrative remedies provided in this article have been pursued or invoked against said person and notwithstanding that civil action for the imposition and collection of a civil penalty or an application for an injunction under the provisions of this article has not been filed against such person.

(g) Where a person holding a permit is carrying out a program of pollution abatement or remedial action in compliance with the conditions and terms of the permit, the person is not subject to criminal prosecution for pollution recognized and authorized by the permit.

(h) Civil penalties are payable to the secretary. All moneys collected under this section for civil fines collected under this article shall be deposited into a restricted account known as the Protect Our Water Fund. All money deposited into this account shall be used by the secretary solely to respond to leaking aboveground storage tanks.

**§22-30-18. Appeal to Environmental Quality Board.**

Any person aggrieved or adversely affected by an order of the secretary made and entered in accordance with the provisions of this article may appeal to the Environmental Quality Board, pursuant to the provisions of article one, chapter twenty-two-b of this code.

**§22-30-19. Duplicative enforcement prohibited.**

No enforcement proceeding brought pursuant to this article may be duplicated by an enforcement proceeding subsequently commenced under some other article of this code with respect to the same transaction or event, unless the subsequent proceeding involves the violation of a permit or permitting requirement of other article.

**§22-30-20. Reporting and accountability.**

(a) Every year, the secretary shall submit a report to the Joint Legislative Oversight Commission on State Water Resources and the Joint Committee on Government and Finance which assesses the effectiveness of this article and provides other information as may be requested by the commission to allow it to assess the effectiveness of this article, including, without limitation, the secretary's observations concerning all aspects of compliance with this article and any legislative rules promulgated pursuant hereto, the regulatory process, and any pertinent changes to federal rules or regulations.

(b) The secretary shall keep accurate accounts of all receipts and disbursements related to the administration of the Aboveground Storage Tank Administrative Fund and shall make a detailed annual report to the Joint Legislative Oversight Commission on State Water Resources and the Joint Committee on Government and Finance addressing the administration of the fund.

(c) The secretary shall keep accurate accounts of all receipts and disbursements related to the administration of the Protect Our Water Fund and shall make a specific annual report to the Joint Legislative Oversight Commission on State Water Resources and the Joint Committee on Government and Finance addressing the administration of the fund.

**§22-30-21. Interagency cooperation.**

(a) In implementation of this article, the secretary shall coordinate with the Department of Health and Human Resources, the West Virginia Public Service Commission, the Division of Homeland Security and Emergency Management and local health departments to ensure the successful planning and implementation of this act, including consideration of the role of those agencies in providing services to owners and operators of aboveground storage tanks and public water systems.

(b) The secretary shall also coordinate with state and local emergency response agencies to prepare and issue appropriate emergency response plans to facilitate a coordinated emergency response and incident command and communication between the owner or operator of the aboveground storage tank, the state and local emergency response agencies and the affected public water system.

(c) The secretary shall also coordinate with the State Fire Marshal in addressing the periodic inspection of local fire departments to include a requirement for inspectors to examine and identify the status of National Incident Management System fire department personnel training.

**§22-30-22. Imminent and substantial danger.**

(a) Notwithstanding any other provision of this chapter to the contrary, upon receipt of evidence that an aboveground storage tank may present an imminent and substantial danger to human health, water resources or the environment, the secretary may bring suit on behalf of the State of West Virginia in the Circuit Court of Kanawha County against any owner or operator of an aboveground storage tank who has contributed or who is contributing to imminent and substantial danger to public health, safety, water resources or the environment to order the person to take action as may be necessary to abate the situation and protect human health, safety, water resources and the environment from contamination caused by a release of fluid from an aboveground storage tank.

(b) Upon receipt of information that there is any aboveground storage tank that presents an imminent and substantial danger to human health, safety, water resources or the environment, the secretary shall provide immediate notice to the appropriate state and local government agencies and any affected public water system. In addition, the secretary shall require notice of any danger to be promptly posted at the aboveground storage tank facility containing the aboveground storage tank at issue.

**§22-30-23. Promulgation of rules.**

The secretary shall promulgate emergency and legislative rules as necessary to implement the provisions of this article in accordance with the provisions of article three, chapter twenty-nine-a of this code.

**§22-30-24. Powers and duties of secretary.**

(a) In addition to the powers and duties prescribed in this chapter or otherwise provided by law, the secretary has the exclusive authority to perform all acts necessary to implement this article.

(b) The secretary may receive and expend money from the federal government or any other sources to implement this article.

(c) The secretary may revoke any registration, authorization or permit for a violation of this article or the rules promulgated hereunder

(d) The secretary may issue orders, assess civil penalties, institute enforcement proceedings and prosecute violations of this article as necessary.

(e) The secretary, in accordance with this article, may order corrective action to be undertaken, take corrective action or authorize a third party to take corrective action.

(f) The secretary may recover the costs of taking corrective action, including costs associated with authorizing third parties to perform corrective action. Costs may not include routine inspection and administrative activities not associated with a release.

**§22-30-25. Scope of article; waiving additional permitting requirements for certain categories of aboveground storage tanks; establishing a process for granting waivers for additional categories of ground storage tanks, by legislative rule, upon verification that the category of tanks are regulated under comparable or more rigorous protective state or federal standards.**

(a) While all aboveground storage tanks shall be required to participate in the inventory and registration process set forth in section four of this article, the following categories of containers and tanks shall not be required to be permitted under section five of this article, either because they do not represent a substantial threat of contamination, or they are currently regulated under standards which meet or exceed the *protective standards and requirements set forth in this article:*

(1) An aboveground storage tank containing drinking water, filtered surface water, demineralized water, noncontact cooling water or water stored for fire or emergency purposes;

(2) Any natural gas or propane tanks regulated under NFPA 58-30A or NFPA 58-30B;

(3) Septic tanks and home aeration systems;

(4) A pipeline facility, including gathering lines, regulated under the Natural Gas Pipeline Safety Act of 1968 or the Hazardous Liquid Pipeline Safety Act of 1979, or an intrastate pipeline facility regulated by the West Virginia Public Service Commission or otherwise regulated under any state law comparable to the provisions of either the Natural

(2) Spill prevention, leak detection and control and inspection requirements which meet or exceed the standards established by the article or by rules promulgated thereunder;

(3) Regular inspections and routine integrity testing requirements which are equally protective to the requirements established pursuant to this article or any rules promulgated thereunder; and

(4) Emergency response and notification requirements which are at least as prompt and comprehensive as the emergency response and notification requirements established by this article or any rules promulgated thereunder.

(c) In lieu of requiring a separate permit issued under this section, the secretary may adopt rules that would allow the requirements of this article to be incorporated into, and enforced through, the state-only portion of a National Pollutant Discharge Elimination System (NPDES) permit or a permit under article six or six-a of this chapter.

(d) If the aboveground storage tank or tanks' location is to be regulated pursuant to a general NPDES permit or an individual NPDES permit, the secondary containment, spill prevention, leak detection and control requirements, inspection requirements, reporting requirements and routine integrity testing requirements for that tank or tanks are to be specifically set forth as enforceable permit conditions and requirements.

## ARTICLE 31. THE PUBLIC WATER SUPPLY PROTECTION ACT.

**§22-31-1. Short title.**

Gas Pipeline Safety Act of 1968 or the Hazardous Liquid Pipeline Safety Act of 1979;

(5) Equipment or machinery containing substances for operational purposes, including integral hydraulic lift tanks, lubricating oil reservoirs for pumps and motors, electrical equipment and heating and cooling equipment;

(6) A mobile tank, truck or rail car that is located on a site for less than sixty consecutive calendar days;

(7) Liquid traps or associated gathering lines related to oil or gas production and gathering operations;

(8) A surface impoundment, pit, pond or lagoon;

(9) Aboveground storage tanks for which spill prevention, control, and countermeasure plans are required by the Environmental Protection Agency (EPA) under 40 CFR Part 112 (oil pollution prevention), unless located within a zone of critical protection:

(b) The Department of Environmental Protection may designate, by legislative rule, additional categories of aboveground storage tanks for which an individual aboveground storage tank permit may be waived, after confirming that the tank is regulated under an existing state or federal regulatory permit or enforceable standard which includes, but is not limited to, the following:

(1) Secondary containment with an impermeable base, which is sufficient to fully contain the contents of the tank or the contents of the largest tank in the group of tanks in the event of a leak from spilling out onto the ground or adjacent surface water;

This article may be known and cited as the Public Water Supply Protection Act.

**§22-31-2. Legislative findings.**

(a) The West Virginia Legislature finds that it is in the public policy of the State of West Virginia to protect and conserve the water resources which are relied upon by the state and its citizens. The state's water resources are vital natural resources that are essential to maintain, preserve and promote human health, quality of life and economic vitality of the state.

(b) The West Virginia Legislature further finds that it is the public policy of the state that clean, uncontaminated water be available for its citizens who are dependent on clean water as a basic need for survival, and who rely on the assurances from public water systems and the government that the water is safe to consume.

(c) The West Virginia Legislature further finds that it is the public policy of the state that clean, uncontaminated water be available to its businesses and industries that rely on water for their economic survival, and the well-being of their employees. These include hospitals and the medical industry, schools and educational institutions, the food and hospitality industries, the tourism industry, manufacturing, coal, natural gas and other industries. Businesses and industries searching for places to locate or relocate consider the quality of life for their employees as well as the quality of the raw materials such as clean water.

(d) The Legislature further finds that large quantities of fluids are stored in aboveground storage tanks, below ground storage tanks, in impoundments and other locations which pose a threat of potential contamination to surface waters and groundwaters which are relied upon as primary sources of public water supplies in the state. Emergency situations involving these fluids can and will arise that may present a hazard to human health, safety, the water resources, the environment and the economy of the state.

(e) It is important that the public water systems, the responding emergency providers and regulatory inspectors and personnel require complete and accurate information regarding the volume, identity, characteristics and qualities of each potential source of significant contamination to efficiently and accurately anticipate and respond to any associated threat to the public posed by a leak or spill event.

(f) The Legislature also finds it reasonable and appropriate to impose additional regulatory oversight and reporting requirements for potential contaminants which are in close proximity to a public water intake, due to the sudden and devastating impact that potential contaminants in that zone pose to a public water system's critical source of supply.

**§22-31-3. Definitions.**

For the purposes of this article:

(1) "Potential source of significant contamination" means a facility or activity that stores, uses or produces compounds with potential for significant contaminating impact if released into the source water of a public water supply.

(2) "Public water system" means:

(A) Any water supply or system which regularly supplies or offers to supply water for human consumption through pipes or other constructed conveyances, if serving at least an average of twenty-five individuals per day for at least sixty impoundments or other primary sources of water supplies which are found on the surface of the state.

(6) "Public surface water influenced groundwater supply source" means a source of water supply from a public water system which is directly drawn from an underground well, underground river or stream, underground reservoir or underground mine, and the quantity and quality of the water in that underground supply source is heavily influenced, directly or indirectly, by the quantity and quality of surface water in the immediate area.

(7) "Zone of critical concern" for a public surface water supply is a corridor along streams within a watershed that warrants more detailed scrutiny due to its proximity to the surface water intake and the intake's susceptibility to potential contaminants within that corridor. The zone of critical concern is determined using a mathematical model that accounts for stream flows, gradient and area topography. The length of the zone of critical concern is based on a five-hour time of travel of water in the streams to the water intake, plus an additional one-fourth mile below the water intake. The width of the zone of critical concern is one thousand feet measured horizontally from each bank of the principal stream and five hundred feet measured horizontally from each bank of the tributaries draining into the principal stream.

**§22-31-4. Inventory of potential sources of significant contamination in a zone of critical concern; registration; permitting; notice.**

(a) To assure protection of the water resources of the state, the secretary, working in collaboration with the Bureau for Public Health and the Division of Homeland Security and Emergency Management, shall compile an inventory of all potential sources of significant contamination contained days per year, or which has at least fifteen service connections, and shall include:

(i) Any collection, treatment, storage and distribution facilities under the control of the owner or operator of the system and used primarily in connection with the system; and

(ii) Any collection or pretreatment storage facilities not under such control which are used primarily in connection with the system.

(B) A public water system does not include a system which meets all of the following conditions:

(i) Consists only of distribution and storage facilities and does not have any collection and treatment facilities;

(ii) Obtains all of its water from, but is not owned or operated by, a public water system which otherwise meets the definition;

(iii) Does not sell water to any person; and

(iv) Is not a carrier conveying passengers in interstate commerce.

(4) "Public groundwater supply source" means a primary source of water supply for a public water system which is directly drawn from a well, underground stream, underground reservoir, underground mine or other primary source of water supplies which is found underneath the surface of the state.

(5) "Public surface water supply source" means a primary source of water supply for a public water system which is directly drawn from rivers, streams, lakes, ponds,

within a public water system's zone of critical concern for all public water systems whose source of supply is obtained from a surface water supply source or a surface water influenced groundwater supply source.

(b) If the secretary shall determine that a designated potential significant source of contamination is not currently permitted and subject to regulation by the secretary under one or more articles of this chapter, and the secretary determines that the public interest in protecting the public drinking waters of the state warrant additional regulation and inspection of the site to protect the public interests, the secretary may require the owner and operator of that facility to register and obtain a permit for its location pursuant to the provisions of this article.

(c) Within sixty days of the date receiving notice from the secretary of the facility's obligation to register pursuant to this article, the owner or operator shall register the location pursuant to the provisions of this section.

(d) The secretary shall prescribe a registration form for this purpose within thirty days of the effective date of the enactment of this article. Any potential significant sources of contamination within a public water system's defined zone of critical concern which are required to register with the Department of Environmental Protection pursuant to this section shall do so within sixty days from the receiving notice of their obligation to register.

(e) Any potential source of significant contamination placed into service on and after the effective date of this section, but prior to the establishment of a permit program, may be required to register by the secretary at any time.

(f) The secretary may charge a reasonable fee to cover the cost of the registration and permitting program. The fee may be set by emergency and legislative rules proposed for promulgation in accordance with the provisions of article three, chapter twenty-nine-a of this code.

**§22-31-5. Promulgation of rules.**

The secretary shall promulgate emergency and legislative rules as necessary to implement the provisions of this article in accordance with the provisions of article three, chapter twenty-nine-a of this code.

**§22-31-6. Powers and duties of secretary.**

(a) In addition to the powers and duties prescribed in this chapter or otherwise provided by law, the secretary has the exclusive authority to perform all acts necessary to implement this article.

(b) The secretary is authorized to utilize his or her authority under the West Virginia Water Pollution Control Act to require appropriate permitting and any other conditions or limitations to assure protection of water intakes in zones of critical concern.

(c) The secretary may receive and expend money from the federal government or any other sources to implement this article.

(d) The secretary may revoke any registration, authorization or permit for a violation of this article or the rules promulgated hereunder.

(e) The secretary may issue orders, assess civil penalties, institute enforcement proceedings and prosecute violations of this article as necessary.

(f) The secretary, in accordance with this article, may order corrective action to be undertaken, take corrective action or authorize a third party to take corrective action.

(g) The secretary may recover the costs of taking corrective action, including costs associated with authorizing third parties to perform corrective action. Costs may not include routine inspection and administrative activities not associated with a release.

**§22-31-7. Public access to information.**

(a) Subject to the exemptions listed in section four, article one, chapter twenty-nine-b of this code, the public shall have access to all documents and information submitted to the agency in accordance with this section pursuant to the state Freedom of Information Act. Records, reports or information obtained from any persons under this article may be disclosed to other officers, employees or authorized representatives of this state or the United States Environmental Protection Agency or of this state if the officers, employees or authorized representatives are implementing the provisions of this article or any other applicable law related to releases of contaminants tanks that impact the state's water resources.

(b) In submitting data under this article, a person required to provide the data may designate the data that he or she believes is entitled to protection under this section and may submit the designated data separately from other data submitted under this article. A designation under this subsection shall be made in writing and in a manner as the secretary may prescribe.

(c) The Department of Environmental Protection shall provide a copy of the compiled list of contaminants in each zone of critical concern to the affected public water system, the Bureau for Public Health, the Department of Environmental Protection and the Division of Homeland Security and Emergency Management. This will enable those entities to possess a compiled list of the types, quantities, characteristics and locations of all of the known potential contaminants within the zone of critical concern for each public water supply. If any of the submitted information is requested to be kept confidential and good cause is found to grant the request, for reasons of security or other legitimate public interest concern, the protected information shall be redacted from public view and kept confidential, and it shall not be subject to public release in response to a Freedom of Information Act request made under chapter twenty-nine-b of this code.

**§22-31-8. Inspections, monitoring and testing.**

(a) For the purposes of developing or assisting in the development of any rule, conducting any study, taking any corrective action or enforcing any provision of this article, any owner or operator of designated site of potential contamination within a zone of critical concern shall, upon request of the secretary:

(1) Furnish information relating to the site and potential contaminants on the site, their aboveground and underground storage tanks, their associated equipment and contents;

(2) Conduct reasonable monitoring or testing;

(3) Permit the secretary, at all reasonable times, to inspect and copy records relating to the facilities and equipment used to store or contain the potential contaminants; and

(4) Permit the secretary to have access to the site for corrective action.

(b) For the purposes of developing or assisting in the development of any rule, conducting any study, taking corrective action or enforcing any provision of this article, the secretary may:

(1) Enter at any time any establishment or other place on the site or where the potential contaminant is located;

(2) Inspect and obtain samples of any fluid contained or stored on the site from any person;

(3) Conduct monitoring or testing of the site and any associated aboveground storage tanks, underground storage tanks, associated equipment, contents or surrounding soils, surface, water or groundwater; and

(4) Take corrective action as specified in this article.

(c) Each inspection shall be commenced and completed with reasonable promptness.

(d) To ensure protection of the water resources of the state and compliance with any provision of this article or rule promulgated thereunder, the secretary shall inspect at least annually any designated site of potential contamination which is located within the zone of critical concern for a public water system's surface water intake.

(e) Due to the potential impact of contaminants within a zone of critical concern on public drinking water supplies, whenever there is an apparent spill of a chemical or substance within a zone of critical concern for a public water system, the Director of the Bureau for Public Health, and his or her representatives or designees, shall have the same right to enter, inspect and conduct sampling and monitoring at any site that is extended by this article to the Department of Environmental Protection.

**§22-31-9. Prohibition of general NPDES permits within a zone of critical concern for sites with aboveground storage tanks; and authorizing the Division of Environmental Protection to require individual NPDES permit for any other site when deemed appropriate.**

Because of the potential public health impact of pollution to downstream public water intakes in a watershed basin designated in an area of critical concern, on and after September 1, 2014, any permittee which presently holds a National Pollutant Discharge Elimination System (NPDES) general permit pursuant to the West Virginia Water Pollution Control Act which has an aboveground storage tank as defined by article thirty of this chapter on a site which is located within any public water system's zone of critical concern must apply for and hold an individual permit under that act. The secretary shall also have the authority to require other holders of a general NPDES permit to obtain an individual NPDES permit, when deemed appropriate to protect the public water supply. Any general NPDES permit held currently under that act shall remain in effect until the individual NPDES permit is either issued or denied.

**§22-31-10. Civil and criminal penalties.**

(a) Any person who fails to comply with an order of the secretary issued pursuant to this article in the time specified in the order is liable for a civil penalty of not more than $25,000 for each day of continued noncompliance.

(b) Any owner or operator of a site designated as a potential source of significant contamination within a zone of critical concern above a public water intake who knowingly fails to register or obtain a permit for an aboveground storage tank or submits false information pursuant to this article is liable for a civil penalty not to exceed $10,000 for each aboveground storage tank that is not registered or permitted or for which false information is submitted.

(c) Any owner or operator of a site designated as a potential source of significant contamination within a zone of critical concern above a public water intake who fails to comply with any requirement of this article or any standard promulgated by the secretary pursuant to this article is subject to a civil penalty not to exceed $10,000 for each day of violation.

(d) Any person who knowingly and intentionally violates any provision of this article shall be guilty of a misdemeanor, and, upon conviction thereof, shall be confined in a regional jail for a period of time not exceeding one year, and be fined an amount not to exceed $25,000.

(e) Any person convicted of a second or subsequent willful violation of subsections (b) or (c) of this section or knowingly and willfully violates any provision of any permit, rule or order issued under or subject to the provisions of this article is guilty of a felony and, upon conviction, shall be imprisoned in a correctional facility not less than one nor more than three years, or fined not more than $50,000 for each day of violation, or both fined and imprisoned.

(f) Any person may be prosecuted and convicted under the provisions of this section notwithstanding that none of the administrative remedies provided in this article have been pursued or invoked against said person and notwithstanding that civil action for the imposition and collection of a civil penalty or an application for an injunction under the provisions of this article has not been filed against such person.

(g) Where a person holding a permit is carrying out a program of pollution abatement or remedial action in compliance with the conditions and terms of the permit, the person is not subject to criminal prosecution for pollution recognized and authorized by the permit.

**§22-31-11. Appeal to Environmental Quality Board.**

A person aggrieved or adversely affected by an order of the secretary made and entered in accordance with the provisions of this article may appeal to the Environmental Quality Board, pursuant to the provisions of article one, chapter twenty-two-b of this code.

**§22-31-12. Public Water System Supply Study Commission.**

(a) There is hereby established the Public Water System Supply Study Commission which is created for the purpose of studying and reporting back to the Joint Committee on Government and Finance on the following subject matters:

(1) A review and assessment of the effectiveness and the quality of information contained in updated source water protection plans required for certain public water systems by the provisions of section nine-c, article one, chapter sixteen of this code;

(2) A review and assessment of the effectiveness of legislation enacted during the 2014 Regular Session of the West Virginia Legislature, as it pertains to assisting public water systems in identifying and reacting or responding to

identified potential sources of significant contamination, and increasing public awareness and public participation in the emergency planning and response process;

(3) The extent of available financing and funding alternatives which are available to existing public water systems to pursue projects which are designed to create alternate sources of supply or increased stability of supply in the event of a spill, release or contamination event which impairs the water system's primary source of supply;

(4) A review and consideration of the recommendations of the U. S. Chemical Safety and Hazard and Investigation Board after its investigation of the Bayer CropScience incident of 2008; and

(5) Any recommendations or suggestions the Study Commission may offer to improve the infrastructure of existing public water systems, to provide safe and reliable sources of supplies, and to pursue other measures designed to protect the integrity of public water service.

(b) The study commission shall consist of the following twelve members, who shall be appointed and comprised as follows:

(1) Four members appointed by the Governor, one of whom shall be a professional engineer experienced in the design and construction of public water systems; one of whom shall be a hydrologist or other expert experienced in determining the flow characteristics of rivers and streams; one of whom shall be an environmental toxicologist or other public health expert who is familiar with the impact of contaminants on the human body; and one citizen representative;

(2) One representative designated by the Rural Water Association;

(3) One representative designated by the Municipal League;

(4) The Secretary of the Department of Environmental Protection or his or her designee;

(5) The Commissioner of the Bureau for Public Health or his or her designee;

(6) The Director of the Division of Homeland Security and Emergency Management or his or her designee;

(7) The Chairman of the Public Service Commission or his or her designee;

(8) One nonvoting member appointed by the President of the Senate; and

(9) One nonvoting member appointed by the Speaker of the House of Delegates.

(c) Reports by the Commission shall be submitted to the Joint Committee on Government and Finance on or before December 15 of each year, beginning December 15, 2014.

## CHAPTER 24. PUBLIC SERVICE COMMISSION.

## ARTICLE 2G. PUBLIC WATER UTILITIES MONITORING REQUIREMENTS.

**§24-2G-1. Public water utilities required to install monitor for contaminants.**

All public water utilities that provide water to more than one hundred thousand customers, including public service districts providing water service and municipally owned and operated utilities, subject to the requirements and limitations of this article, shall implement a regular monitoring system as specified to the same technical capabilities for detection as utilized by the Ohio River Valley Water Sanitation Commission.

**§24-2G-2. Requirements.**

(a) Each public water utility, public service district or municipal water system, as set forth in section one of this article, shall provide testing for contamination of its water supply by the following contaminants:

(1) Salts or ions;

(2) Metals, including heavy metals;

(3) Polar organic compounds;

(4) Nonpolar organic compounds;

(5) Volatile compounds, oils and other hydrocarbons;

(6) Pesticides; and

(7) Biotoxins.

(b) Each public water utility is empowered to determine at its discretion which of the contaminants listed in subsection (a) are most likely to contaminate its water supply, and shall provide a monitoring system which shall detect the three of the listed contaminants deemed most likely to affect that water system: *Provided,* That each public water utility shall file its list with the commission: *Provided, however,* That any public water system serving over one hundred thousand customers from any one treatment plant is requested to test for all listed contaminants at each treatment plant: *Provided further,* That if technology to adequately detect contaminants, as required by this section proves to be not feasible to implement, the public water utility shall report by January 1, 2015, such to the Joint Committee on Government and Finance with the reasons why such technology is not feasible to obtain or use, and suggest alternatives.

The Joint Committee on Enrolled Bills hereby certifies that the foregoing bill is correctly enrolled.

..............................................................
*Chairman Senate Committee*

..............................................................
*Chairman House Committee*

Originated in the Senate.

In effect ninety days from passage.

..............................................................
*Clerk of the Senate*

..............................................................
*Clerk of the House of Delegates*

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*President of the Senate*

..............................................................
*Speaker of the House of Delegates*

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The within .......................................................................... this

the............. Day of ................................................................., 2014.

..............................................................
*Governor*

Our Water WV

Responding to the Freedom Industries chemical spill

# Final summary of SB 373

We posted a lot about SB 373 over the past several weeks, as it made its way through various committees and numerous amendments. Here is the most recent version <http://www.legis.state.wv.us/Bill_Text_HTML/2014_SESSIONS/RS/amendments/SB373%20HFIN%20AM%203-3%20_1%20adopted%20as%20amended.htm> of the bill we can find; this is the version passed by the House last Thursday, but before the Marcum amendment was removed by the Senate. (Note that changes to existing code made by the bill are marked with underlining or strike-throughs.)

The bill contains a lot of provisions that community groups fought hard for, and it is far better than the narrow bill originally proposed by Governor Tomblin after his "stakeholder" meeting <http://ourwaterwv.org/gov-tomblins-secret-meeting-on-freedom-spill-response/> with industry lobbyists. And public outcry and advocacy forced the Tomblin administration to take stances that they did not initially support, with Governor Tomblin ultimately praising the legislation <http://blogs.wvgazette.com/coaltattoo/2014/03/09/what-now-for-west-virginia-its-water-and-its-future/#more-35945> for its medical monitoring, water utility early warning monitoring, and annual tank inspection provisions — provisions which appeared nowhere in the Governor's original bill.

Here is a run down of what is in SB 373:

- A new regulatory regime for aboveground storage tanks that requires (among other things) a leak detection system, a spill prevention response plan, and annual inspections. The DEP may assess fees to cover the cost of implementing and enforcing these regulations.
- An exemption for tanks holding less than 1320 gallons and for tanks that mix or manufacture chemicals, rather than simply storing them.
- An exemption for tanks that "are currently regulated under standards which meet or exceed the protective standards and requirements set forth" in SB 373, which includes certain natural gas facilities, surface impoundments, and other facilities. The DEP has the discretion to exempt additional facilities that are already subject to certain state or federal standards.
- A requirement that any storage tank larger than 1320 gallons and located in the zone of critical concern of a drinking water intake must hold a site-specific individual NPDES Clean Water Act permit, rather than a general permit.
- A requirement that all public water utilities in the state that rely on surface water complete a source water protection plan by July 1, 2016. "Every effort shall be made to inform and engage the public, local governments, local emergency planners, local health departments and affected residents at all levels of the development of the protection plan." The plan must also include an analysis of the feasibility of a secondary intake, additional water storage, or building interconnections with another utility system. And it must include an analysis of the feasibility of implementing an early warning monitoring system.
- Confidentiality provisions that prevent the public from learning the exact location of potential contaminant sources under the Freedom of Information Act.
- Increased fines for public water systems that violate DHHR's regulations on water quality
- Establishment of a Public Water Supply Study Commission to report back to the legislature regarding, among other things, a review of the Chemical Safety Board's recommendations and to provide recommendations on how to "improve the infrastructure of existing public water systems, to provide safe and reliable sources of supplies, and to pursue other measures designed to protect the integrity of public water service." The Commission will have 12 members, 4 appointed by the Governor (including a water systems engineer, a hydrologist, an environmental toxicologist, and a citizen representative) and 8 representing various agencies (including the DEP, Bureau of Public Health, Division of Homeland Security,

the Public Service Commission and others). While this is a far cry from actually implementing the CSB's recommendations, it is a step in the right direction.

- A requirement that all utilities serving at least 100,000 customers (WV American Water is the only utility <http://www.psc.state.wv.us/AnnualStatRpts/anstatrpt2012.pdf> that falls into this category) to install the same monitoring system <http://www.orsanco.org/images/stories/files/Spills/ElkRiverSpill.pdf> as the Ohio River Valley Water Sanitation Commission. The rest of the state's water utilities are required to provide a monitoring system for the most important potential contaminants in their water supply, unless such a system is not feasible to implement.
- A requirement that the Bureau of Public Health collect information from health providers about patients treated for symptoms and illnesses resulting from the chemical spill. The bill does not provide funding for long-term medical monitoring but does require the Bureau of Public Health to pursue federal funding for such a study.

One thing that didn't make it into the bill was the citizen suit amendment, which would have given citizens the ability to sue state agencies that were not enforcing provisions of the aboveground storage tank portion of the act. As Ken Ward points out <http://blogs.wvgazette.com/coaltattoo/2014/03/09/what-now-for-west-virginia-its-water-and-its-future/>, this is a fairly common occurrence. (*Update, 3/12/14: It was just pointed out to me that the bill does still contain citizen suit provisions with regard to any tank regulated by a general or site-specific NPDES Clean Water Act permit. The bill states that "the secondary containment, spill prevention, leak detection and control requirements, inspection requirements, reporting requirements and routine integrity testing requirements" will be required conditions of the tank's NPDES permit, which means that the Clean Water Act's existing citizen suit provisions will apply to those tanks*).

As we have stated repeatedly here on Our Water, the water crisis was a result of systemic regulatory failure and a culture of under-regulation that has pervaded West Virginia state government for decades. Passing one bill is but a small step towards addressing that fundamental problem. If we are to really change the way regulations are enforced in West Virginia, citizen engagement cannot end with the end of the legislative session.

Posted by Cathy on Posted in WV Legislature <http://ourwaterwv.org/category/wv-legislature/>

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- **Contact us**

  info@ourwaterwv.org

## binetti, victoria

**From:** Ex. 6 - Personal Privacy
**Sent:** Friday, March 28, 2014 3:39 PM
**To:** Arguto, William; binetti, victoria; Ex. 6 - Personal Privacy
**Subject:** Agenda for Monday meeting at 10 am
**Attachments:** SB 373 (R0886123x9E064)-c.pdf

Here are some topic areas for our discussion on Monday. WV SB 373 outlines three major requirements on water systems:

Watershed protection plans (see pages 12 - 18)
Assessment of alternative intakes/supplies (see pages 14 - 15)
Early warning monitoring (see pages 82 - 84)

We can also have a brief discussion of the AW document on MCHM


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NOTE: new phone number!

Ex. 5 - Deliberative

Ex. 5 - Deliberative

Ex. 5 - Deliberative

# Ex. 5 - Deliberative

# Ex. 5 - Deliberative

| | | | FUTURE |
|---|---|---|---|
| ***What are the FTE and extramural funding realities at play in the Region?*** | ***To which enforcement areas would you add resources, if you had new resources?*** | ***What enforcement areas or activities in your Region produce the greatest environmental results for the cost?*** | ***Over the next three years, what are the biggest challenges for the Region's enforcement programs?*** |
| • Loss of **FTE (about 10% loss over the last 3 FYs)**<br>• Decreasing extramural funding for SEEs and contractors and core NPDES program support outside of the Chesapeake Bay.<br>• In the UIC program, FTE losses from both OW and OECA over the last several years. All activities are DI related. More than three times as many permit applications being received , permit appeals to EAB, tapping both program and ORC staff in permit decisions which can draw from new enforcement starts<br>• Field activities curtailed due to lack of travel funds and late funding. Resources used in | • CWA state oversight<br>• Vessel general permit compliance and enforcement<br>• More industrial enforcement since the focus has been heavy on the municipal side<br>• Pretreatment program oversight for industrial sources – EPA in DI mode<br>• Data analysis and inspection targeting.<br>• CD monitoring and oversight.<br>• Administrativ e case | • Mining Sector cases have been hugely significant in multiple states and mine operations – addressing the leading causes of stream impairment in R3<br>• Municipal CSO/SSO cases produce significant pollutant reduction numbers but take significant time to develop.<br>• Integrated SDWA/CWA initiatives and action where protection of drinking water sources occurs – public health benefit. E.g. Nitrate in GWater<br>• Direct implementation of all classes of UIC wells. SEE inspections of class V and staff inspections of Class II and class V attempting to | • Continued reduction in the workforce: not enough bodies to cover as many new starts and maintenance of growing active cases.<br>• Demand for renegotiation of CDs in the municipal arena<br>• Dedicating sufficient time to effective risk targeting to prevent disasters – e.g., WV DW emergency<br>• Skill sets. needed for the future workforce<br>• Taking advantage of next gen opportunities<br>• Implementing a state review process that captures state performance with lower transaction costs<br>• Cover all programs |

# Ex. 5 - Deliberative

# Ex. 5 - Deliberative

KANAWHA-CHARLESTON HEALTH DEPARTMENT
108 Lee Street, East / PO Box 927
Charleston, WV 25323-0927
(304) 344-KCHD (5243)

www.kchd.wv.org

Rahul Gupta, MD, MPH, FACP
Executive Director/Health Officer

April 28, 2014

2014 MAY -1 AM 11: 35

Regina McCarthy, Director
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

Dear Ms. McCarthy:

In our society, we assume the air we breathe and the water we drink are safe. Residents in the nine-county area in West Virginia affected by the January 9, 2014 Freedom Industries chemical leak that contaminated the public water supply of 300,000 residents no longer enjoy that feeling of safety.

So far an estimated 92,000 people have suffered some form of health impact as a result of the recent chemical contamination of the drinking water related to Elk River incident. As of late March, water testing revealed that after it was treated, the water leaving the West Virginia American Water's treatment plant still contained 4-methylocyclohexane methanol or MCHM. Of additional concern is that it is currently not known whether or not our water is free of MCHM. The public also remains worried as to what health effects exposure to this chemical may have in the long-term since no scientific data exists in regards to crude MCHM or PPH.

The progression of this crisis has been unique, unpredictable and clearly lasted longer than we could have expected. A key element to the dictation of this sequence has been the remarkable lack of science to guide sound decision making. In order to restore the trust of my fellow West Virginians in their drinking water supply, I would request that you make it a priority of your agency to conduct all the necessary scientific analysis and share the process as well as results with the public in a transparent and timely manner. Furthermore, developing a sampling detection method for MCHM and PPH at the lowest detectable concentrations as well as an inhalation standard for MCHM and PPH is strongly recommended. Additionally, local, state and federal agencies must partner to conduct research and study the public health impact of this exposure.

Finally, I would also like to extend an invitation to you to visit the affected area and engage the citizens and their representatives in a dialogue that will result in meaningful solutions that will protect the nation's water supplies and the health of its citizens.

Sincerely,

Rahul Gupta, MD, MPH, FACP
Executive Director/Health Officer

RG/lk

**Kanawha-Charleston Health Department**
108 Lee Street East
Charleston, WV 25301

Regina McCarthy, Director
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

# Ex. 5 - Deliberative

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# Ex. 5 - Deliberative

35TH CST (WMD) SAMPLE LOG FOR WV AMERICAN WATER INCIDENT As of: 1/11/2014 19:00

| SAMPLE LOCATION / COUNTY | DTG | SAMPLE NUMBER | SAMPLE TEAM | RAW INTAKE RESULTS | FINISHED WATER RESULTS |
|---|---|---|---|---|---|
| WVAW / Kanwaha | 101230RJAN14 | 12:30 | WVAMW | 1.04 PPM | 1.021 PPM |
| | | | | 3.35 PPM | 1.56 PPM |
| WVAW / Kanwaha | 101355RJAN14 | 13:55 | WVAMW | 1.229 PPM | 0.906 PPM |
| | | | | 1.19 PPM | 1.3 PPM |
| WVAW / Kanwaha | 101600RJAN14 | 16:00 | WVAMW | 1.222 PPM | 0.856 PPM |
| | | | | 1.39 PPM | 1.23 PPM |
| WVAW / Kanwaha | 101755RJAN14 | 17:55 | WVAMW | 0.802 PPM | 0.777 PPM |
| | | | | 1.27 PPM | 1.28 PPM |
| WVAW / Kanwaha | 101950RJAN14 | 19:50 | WVAMW | 0.785 PPM | 0.809 PPM |
| | | | | 2.2 PPM | 2.4 PPM |
| WVAW / Kanwaha | 112300RJAN14 | 23:00 | WVAMW | 1.70 PPM | 0.75 PPM |
| | | | | | |
| WVAW / Kanwaha | 110100RJAN14 | 1:00 | WVAMW | 1.647 PPM | 0.628 PPM |
| | | | | | |
| WVAW / Kanwaha | 110300RJAN14 | 3:00 | WVAMW | 1.081 PPM | 0.649 PPM |
| | | | | | |
| WVAW / Kanwaha | 110500RJAN14 | 5:00 | WVAMW | 1.87 PPM | 1.01 PPM |
| | | | | | |
| WVAW / Kanwaha | 110700RJAN14 | 7:00 | WVAMW | 1.30 PPM | 1.10 PPM |
| | | | | | |
| WVAW/Kanawha | 110902RJAN14 | 9:02 | WVAMW | 0.70 PPM | 0.60 PPM |
| | | | | | |
| WVAW / Kanwaha | 111000JAN14 | 10:00 | WVAMW | 0.488 PPM | 0.622 PPM |
| | | | | | |
| WVAW/Kanawha | 111415RJAN14 | 14:15 | WVAMW | 0.8 PPM | 0.30 PPM |
| | | | | | |

**Bloomberg Businessweek**

## Companies & Industries

http://www.businessweek.com/articles/2014-01-30/west-virginia-chemical-spill-mystery-who-runs-freedom-industries

# Who Runs Freedom Industries? West Virginia's Chemical Spill Mystery

By Paul M. Barrett January 30, 2014

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Before the lawsuits and the retreat into federal bankruptcy court, before the change in ownership in a veiled roll-up by an out-of-state coal baron, before the Justice Department's environmental-crimes investigation, the presidentially declared emergency, and the National Guard's arrival—nine years before all of that—the co-founder of Freedom Industries, the company at the center of the Jan. 9 chemical spill that cut off tap water for 300,000 West Virginians, was convicted of siphoning payroll tax withholdings to splurge on sports cars, a private plane, and real estate in the Bahamas. And 18 years before that, in 1987, before he started Freedom Industries, Carl Kennedy II was convicted of conspiring to sell cocaine in a scandal that brought down the mayor of Charleston.

Little known, even locally, Freedom was born and operated in a felonious milieu populated by old friends who seemed better suited to bartending at the Charleston-area saloons they also owned. "These people who were running Freedom Industries weren't the sort you'd put in charge of something like chemical storage that could affect the whole community," Danny Jones, Charleston's current mayor, says. "Who are these guys, anyway?"

Good question. Kennedy kept the books for bars and restaurants, including a rib house Mayor Jones used to own, although he hadn't gotten to know him well. "He was pleasant enough," Jones says. Until the spill, the mayor had no idea his former accountant had been enmeshed with Freedom. That really seems troubling, Jones says, "especially with the cocaine stuff in his history."

Kennedy's main partner was a college buddy named Dennis Farrell, who had some technical background and took over Freedom after Kennedy went to prison in 2006. By Farrell's own account, the company, founded in 1992, nearly ran aground on his watch. Only a rescue in 2009 funded by the federal antirecession stimulus program kept the company going.

The third member of the company's leadership triad, Gary Southern, has served as Freedom's public face since the spill. He lives in Marco Island, Fla., and says he'd been advising the company for several years before becoming full-time president in 2013. Not blessed with a talent for public expression, Southern didn't mention in the first days after the leak of 10,000 gallons of coal-processing compounds that Freedom had been acquired, only 10 days earlier, by Cliff Forrest.

A different sort of character from Kennedy, Farrell, and Southern, Forrest founded and heads Rosebud Mining, the third-largest coal producer in Pennsylvania and the 21st-largest in the country. He's a prominent figure in his industry and an opponent of what he calls the Obama administration's "war on coal." Why he wanted Freedom's decrepit facilities for blending and distributing chemicals remains a mystery. Publicly, Forrest hasn't said a word. His connection to Freedom wasn't confirmed until Jan. 17, when his lawyers put the company into bankruptcy. The Chapter 11 filing in Charleston required disclosure of a financial paper trail that led to Forrest's coal company headquarters near Pittsburgh via another entity called Chemstream Holdings.

So while the spill revealed once again that porous legislation and murky assumptions about industry self-policing hinder oversight of dangerous chemicals, it also highlighted a peculiar and deeply troubling element of American commerce, one where holding companies and roll-ups make it difficult to determine who's accountable.

Kennedy grew up in Montgomery, W. Va., a small city on the Kanawha River. He went to college there at West Virginia University Institute of Technology. It was later, in Charleston, that he attained a measure of notoriety.

West Virginia's rugged mountains and forested hollows are home to struggling coal-mining communities. Locals call the Kanawha region Chemical Valley because of the network of foul-smelling refining plants spread across it. The state ranks among the nation's poorest. Charleston, with its office towers and expensive eateries, is a place apart: Home to a social and business elite of lawyers, lobbyists, and coal executives, the capital enjoys a wealth and élan alien to the state's rural and industrial precincts.

In the mid-1980s, Kennedy moved easily in a narcotic-fueled night scene associated with Charleston's Republican mayor at the time, James "Mad Dog" Roark. Targeted by a federal investigation, Roark pleaded guilty to cocaine possession in 1987, resigned as mayor, and went to jail. The same year, Kennedy, then 30 years old, was charged with distributing the not-trivial amount of 10 ounces to 12 ounces of coke. In a plea deal, he admitted to one distribution count and was sentenced to five years' probation. In all, federal prosecutors notched some 30 convictions.

A forgiving town, Charleston didn't ostracize Kennedy. Despite his criminal record, he and Farrell became prolific business partners. Farrell had earned a master's degree from West Virginia University and for a time was employed by a company called Sherex Chemical. Together they invested in commercial real estate and a saloon in Montgomery called the Bank Bar & Grill. In a laudatory 2002 article, the *Charleston Gazette* marveled at the pair's "far-flung array of business ventures," which included a manufacturer of a synthetic fuel additive, a trucking company, and a plant in the town of Nitro, W. Va., that mixed chemicals. Kennedy's portfolio also contained Freedom Industries, which he incorporated in 1992, according to filings with the West Virginia secretary of state. (Kennedy, Farrell, and lawyers who have represented them over the years all failed to respond to telephone and e-mail messages.)

Kennedy's work with the tax ledgers at Freedom is what got him back into serious trouble. When armed IRS agents showed up at his office in Charleston in 2004, he knew why they'd come. "He quickly admitted everything he [had] done," his criminal defense lawyer, John Kessler, later told U.S. District Judge John Copenhaver Jr., according to the *Gazette*. Kennedy pleaded guilty to pocketing more than $1 million withheld from Freedom employees' paychecks that he was supposed to have passed along to the federal government. He admitted, as well, that he'd evaded personal taxes of $510,040.96. "These are large sums," Copenhaver observed in court. He'd been the judge for Kennedy's earlier cocaine conviction. "It seems to me," Copenhaver said during a hearing in January 2006, "you would have learned from past experience." Since Kennedy apparently hadn't, the judge sentenced him to 40 months behind bars.

Kennedy's lifestyle had been expensive, court records showed. Among his possessions were a Hummer H2, two MGB sports cars, five Ford trucks, a pair of excavator vehicles, a private plane, and three two-acre plots on Rum Cay, an island in the Bahamas. His wife, Kathy, had filed for divorce.

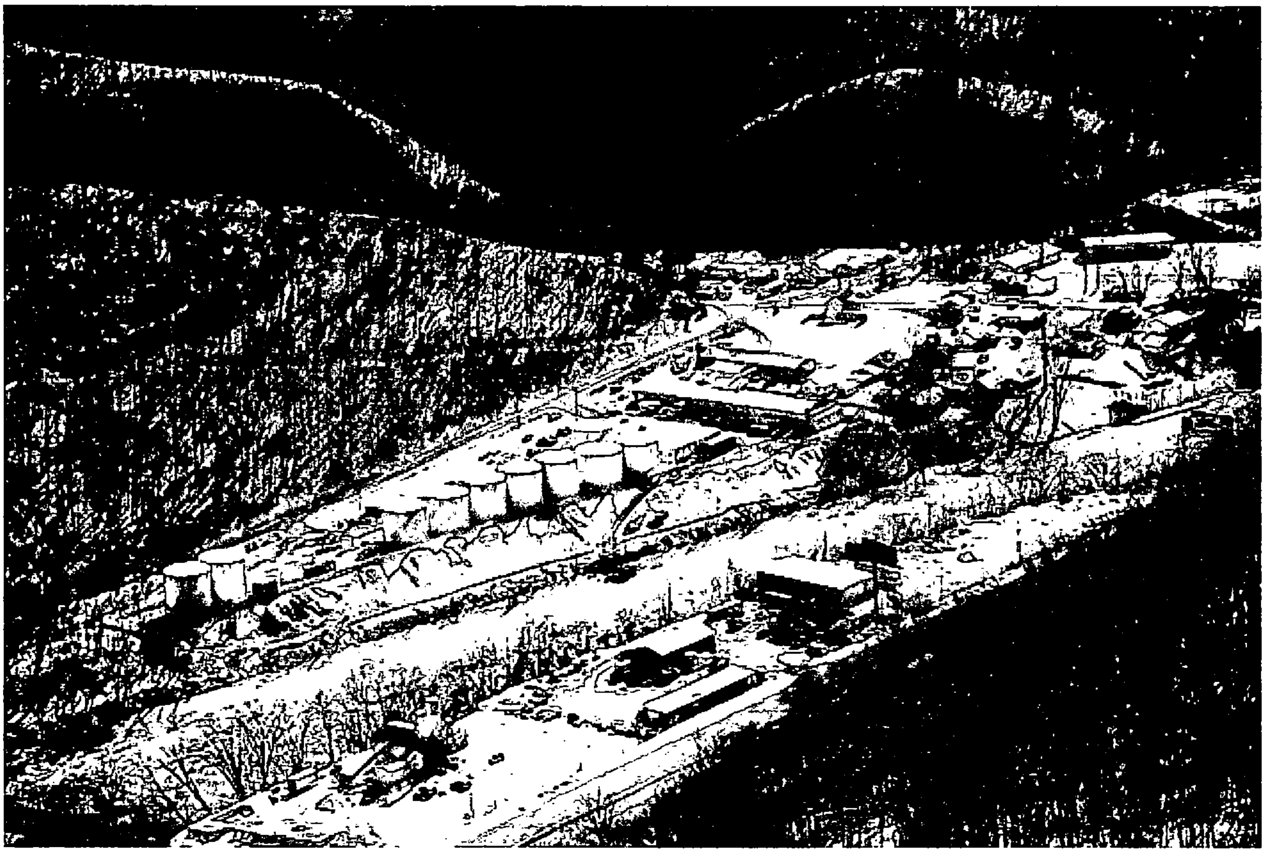
In 2005 a prison-bound Kennedy filed for personal bankruptcy. He left Freedom and began to sell his business investments. Freedom, for its part, failed to file an annual report that year and had its state business license revoked. It later reorganized and got its paperwork in order. Freedom sued Kennedy in 2005, seeking to get back money he allegedly misappropriated. Not in a conciliatory mood, perhaps because of his date with the Federal Bureau of Prisons, Kennedy filed a counterclaim against Freedom for the value of his 45 percent ownership stake. That dispute resulted, strangely, in the company paying him $800,000 in a settlement.

Nothing if not enterprising, Kennedy eventually struck a deal to get his prison sentence reduced. In exchange for his help with a drug investigation, federal prosecutors persuaded Judge Copenhaver to release Kennedy after only 22 months. An assistant U.S attorney named Monica Schwartz told the judge that Kennedy "was anxious to cooperate." Under the supervision of federal agents, he made "controlled buys" of cocaine that led to the convictions of two longtime business associates.

Freedom survived Kennedy's cooking the books, with Farrell replacing his college classmate as president. The compounds the company wholesales control road dust, keep coal from freezing, and help prepare the fuel for burning. One Freedom facility, a tank farm along the Elk River formerly used by Pennzoil (RDS/A) to store gasoline, has 17 huge steel vats capable of holding 35,000 gallons each. Known as the Etowah River Terminal, the tank farm "processes large volumes of chemicals rapidly and cost effectively," Freedom's website says. The riverside location allows the plant to do business by barge as well as truck.

Much of Freedom's commerce comes from distributing products made by larger companies, including a chemicals unit of Georgia-Pacific owned by billionaire brothers Charles and David Koch. In May 2008, Georgia-Pacific Chemicals announced that Freedom would serve as a distributor of its Talon mining reagents—compounds that reduce ash content and prevent the loss of combustible coal—in eight states: West Virginia, Virginia, Pennsylvania, Ohio, Maryland, Minnesota, Kentucky, and Michigan. (Four years later, Georgia-Pacific ended Freedom's distribution role, the manufacturer said in a written statement. Georgia-Pacific didn't explain the change and said the West Virginia company is "still a customer of ours.")

In 2009, Farrell told the *Charleston Daily Mail*, Freedom faced having to shut down its main Elk River location because silt buildup made it difficult for barges to travel from the terminal to the confluence with the Kanawha River. "At some point, we wouldn't have been economically fit to run the facility," Farrell said. "That's our claim to fame—the barges." The U.S. Army Corps of Engineers came to the rescue. With $400,000 in federal stimulus money, the Army Corps dredged the Elk River and kept the Freedom plant viable.



Photograph by Paul Corbit BrownAll 17 of the storage tanks operated by Freedom Industries on the Elk River will be scrapped following the leak that led to more than 30 hospitalizations, treatment for hundreds, and egg on the faces of state regulators. Since the spill, first indicated through reports of its odor by nearby residents at 8 a.m. on Jan. 9, the West Virginia Department of Environmental Protection has twice increased its estimate of the scale of the contamination, first from 5,000 gallons to 7,500 gallons and then to 10,000 gallons, as of Jan. 27

Freedom and a constellation of affiliated companies were dissolved and reformulated several times in the 2000s, state records show. The purpose of this paper shuffling wasn't disclosed. Freedom's operations along the Elk River did not receive much government oversight, according to records and local officials. The U.S. Environmental Protection Agency leaves regulation of such chemical facilities primarily to the states. West Virginia doesn't view that delegation of authority as reason to regulate aggressively, however. To the contrary, the state prides itself on being industry-friendly, and Governor Earl Ray Tomblin, a Democrat, routinely castigates what he calls federal overreaching. West Virginia doesn't require inspection of storage tanks containing potentially dangerous coal-processing chemicals, according to Larry Zuspan, who runs the local emergency planning committee in Charleston. What made the Freedom tank farm on the city's outskirts unusual, even for West Virginia, is that the regional utility operates the sole intake for the area's public water system only a mile and a half downriver.

Also surprisingly close to the Freedom site is a cluster of working-class homes. From time to time over the years, Mayor Jones says, people have complained to state authorities about unpleasant odors wafting from the facility. State inspectors have looked around but never reported anything amiss, according to available records. In particular, they didn't notice that a concrete containment wall meant to prevent any tank leakage from reaching the river was visibly cracked, Jones says. Only after the Jan. 9 spill did Freedom disclose that sometime in 2013 it had set aside $1 million to fix the wall and make other improvements; for reasons that haven't been clarified, the repairs hadn't started. On Jan. 25, Governor Tomblin's office announced that the state had ordered Freedom to shut down and dismantle the entire tank farm because all 17 tanks lack adequate containment walls to prevent leaks from spreading.

At some point recently, Forrest, the man in charge of Rosebud Mining in Kittanning, Pa., decided that Freedom Industries was worth owning. Named for the flower, not the enigmatic line from *Citizen Kane*, Rosebud calls itself "a great employer—and a great neighbor." Forrest, a plainspoken executive, voted for Barack Obama in 2008 but then turned bitterly against the president because of what Forrest perceived as the White House's hostility to coal. In an interview with Bloomberg TV in October 2012, he warned that if Obama was reelected, the industry might not survive.

Despite that grim assessment, Forrest last year went ahead with his acquisition of Freedom, which relies heavily on coal company clients for its $30 million in annual revenue. On Dec. 6, Forrest, operating via Chemstream, agreed to pay $20 million to Freedom's three owners—Farrell and two other men. Then, on Dec. 31, Forrest merged Freedom with three smaller companies. Neither transaction received any publicity. Nine days later, the water supplies were shut down.

Residents began reporting a licorice-like smell coming from the Freedom tank farm a little after 8 a.m. on Jan. 9, a Thursday. State inspectors drove to the facility and by 11:15 a.m. located a 4-foot-wide stream of 4-methylcyclohexane methanol, or MCHM, seeping through the cracked containment wall and into the Elk River. By noon, the West Virginia unit of American Water Works (AWK), a large publicly traded utility company, had been informed of the contamination. The water company added carbon filters in an attempt to keep the MCHM out of its treatment plant but decided not to shut the intake.

Photographs by Michael Switzer/AP Photo; Lisa Hechesky/Reuters By the time tap water was declared safe to drink again, four days after the spill, FEMA had trucked in more than 530,000 gallons of bottled water

Not until 12:05 p.m. did Freedom officials finally call a West Virginia hotline to report the leak—a step state officials say they were supposed to have taken immediately. By late afternoon, MCHM was found in tests of filtered water. Shortly before 6 p.m., Governor Tomblin announced a ban on water use for drinking, cooking, and bathing. President Obama declared a federal emergency the next morning, authorizing the National Guard to truck water into Charleston and eight surrounding counties.

Harmful if swallowed or inhaled, MCHM can cause skin irritation, nausea, and vomiting, according to the American Association of Poison Control Centers. Apart from that, relatively little is known about MCHM's effect on humans. It's one of the thousands of chemicals that weren't tested when they were grandfathered in for commercial use under the Toxic Substances Control Act of 1976, says Daniel Rosenberg, a senior attorney with the nonprofit Natural Resources Defense Council. More than 500 West Virginians have reported symptoms possibly related to exposure to MCHM. While more than 30 were admitted to hospitals, there haven't been any deaths or serious illnesses reported.

On Friday evening, Jan. 10, Southern, the man listed in state records as Freedom's president, called a press conference. (Confusingly, the company's website still says Farrell is the president.) No mention was made of the company's sale to Forrest. Southern, who has close-cropped white hair and a British accent, is affiliated with a number of companies in addition to Freedom, according to public records. These include Blackwater Consulting Group in Marco Island, the Florida resort where he lives; Ecodrill, also located in Marco Island; and HVC, a chemical company in Cincinnati.

At the press conference, Southern initially apologized. "This incident," he said, "is extremely unfortunate, unanticipated, and we are very, very sorry for the disruption of everyone's daily life."

His explanation, however, was vague. He said Freedom employees became "aware" of a leak "around 10:30 a.m.," more than two hours after residents first complained of the licorice odor. He conceded that the company had "occasionally" had "reports of an odor previously," but he didn't elaborate on what preventive steps, if any, had been taken. "It has been an extremely long day," he continued, looking exasperated. "I would appreciate it if we could wrap this thing up." A local reporter interjected that it had "been an extremely long day for a lot of people" without water. Sipping from a plastic bottle of water, Southern answered several more queries before abruptly walking away.

Two days later, Charles Ryan Associates, a prominent Charleston public-relations firm, dropped Freedom as a client, refusing to explain why. A woman who answered my call to Freedom's corporate office said executives weren't available. She referred me to what she said was a public-relations firm; the Florida phone number connected to an answering machine where messages left over several days went unanswered.

In the hours after the spill, additional insight into the mood within Freedom came from Kathy Stover-Kennedy, Carl Kennedy's ex-wife. Now Farrell's girlfriend, Stover-Kennedy took to her Facebook page (since deleted) to defend her ex-husband's ex-partner. "I'm not asking for anyone's sympathy but a little empathy wouldn't hurt," she wrote. "And just so you know, the boys at the plant made and drank coffee this morning! I showered and brushed my teeth this morning and I am just fine!" Noting "criticism from many about how Freedom Industries is handling this," Stover-Kennedy continued: "Denny is not a spokesman and has no desire to be. His expertise was much needed elsewhere." She didn't respond to phone messages.

Meanwhile, Randy Huffman, cabinet secretary of West Virginia's Department of Environmental Protection, was also on the defensive. Since the spill, Huffman has tried to explain why his agency didn't show more skepticism earlier about Freedom. One point he's stressed to journalists is that as far as state and federal chemical classifications go, MCHM isn't considered "hazardous." Freedom thus didn't need a special state permit to store the compound, he said. Records released in the wake of the spill show that West Virginia inspectors had visited the Elk River tank farm at least five times since 2001 but focused primarily on air quality.

## One Year: 3,885 Spills

**The West Virginia chemical spill might seem like a rare catastrophe, but this type of thing happens every day in the U.S., as these data and media reports make clear. —*Eric Chemi***

The 3,885 tally for 2013 is based solely on self-reports of accidents from 76 publicly traded American companies. Ten U.S. companies reported more than 100 spills each.

From 2001 to 2010, there were 992 oil and gas fluid spills in three Colorado counties alone.

In 2011, 1,374 facilities in the U.S. discharged approximately 194 million pounds of chemicals into streams, rivers, lakes, and oceans.

An analysis by CBS found more than 6,500 industrial accidents, fires, spills, and leaks in 2010—for an average of 18 a day.

DATA: BLOOMBERG ESG DATA TEAM

The company that made the MCHM, Eastman Chemical (EMN), based in Kingsport, Tenn., discloses in publicly available information that MCHM has a U.S. Occupational Safety and Health

Administration rating of "hazardous." Rosenberg of the Natural Resources Defense Council explains that the apparent contradiction over MCHM's danger level isn't unusual. "We rely on manufacturers to test the vast majority of chemicals used in commerce," he says, "so there just isn't much consistency or certainty."

Within 24 hours of the announcement of the contamination, plaintiffs' attorneys were heading to Charleston's state and federal courthouses to sue Freedom, West Virginia-American Water, and Eastman. More than two dozen suits have been filed so far, some seeking class-action status. All three companies have denied wrongdoing. Although she forcefully rejected the accusation that Eastman failed to provide adequate warnings about MCHM, a company spokeswoman pointedly told me the manufacturer couldn't vouch for the conduct of Freedom or the water utility.

On Jan. 17, Freedom filed for Chapter 11 protection. That had the effect of freezing the liability suits against the company while U.S. Bankruptcy Judge Ronald Pearson sorts out creditors' claims. During a preliminary hearing on Jan. 21, Pearson called the situation "one of the most unusual Chapter 11 cases I've seen."

Freedom's bankruptcy attorneys, led by Mark Freedlander of the Pittsburgh office of McGuireWoods, immediately floated a theory designed to ease Freedom's liability. "It is presently hypothesized," they wrote in one filing, "that a local water line break [caused] the ground beneath a storage tank at the Charleston facility to freeze in the extraordinary frigid temperatures in the days immediately preceding" what Freedlander delicately termed "the incident." He further hypothesized that "the hole in the affected storage tank" was caused by "an object piercing upwards through the base" of the tank.

The implication is that water expanded as it froze, pushing the mystery "object" up through the floor of the tank. It's difficult to say whether the court will buy this explanation. Certainly plaintiffs' attorneys are going to argue that steel tanks containing dangerous chemicals ought to be able to withstand winter weather.

Testifying at the preliminary hearing, Southern continued in the obtuse vein of his prior appearance. "The unfortunate incident of the 9th, which resulted in material leaving the facility," he said, "caused an otherwise profitable and successful company to endure the tragedy of consequence relating to that which we've dealt with since the 9th." A company lawyer hastened to clarify that Southern, who said he'd worked in the chemicals industry for 30 years, didn't mean to imply that Freedom had been negligent. "Absolutely not. No sir," Southern said.

Mayor Jones wasn't impressed. "I don't think any of these people at the company seems honest," he says. And he worries that Charleston's woe isn't over. Many residents, he says, are still scared to drink from the tap. The U.S. Centers for Disease Control and Prevention in Atlanta has warned pregnant women that they ought to play it safe and stick to bottled water.

In response to orders from state officials, Freedom moved its MCHM supply from the Elk River facility to its location in Nitro. After the MCHM had been transferred, though, state environmental authorities cited the Nitro operation for five fresh violations. The most urgent related to the absence of a secondary containment wall—an ominous reminder of the apparent failure of the aging cement wall on the Elk River. "Given what we've been through, it would be very hard for me to convince anybody that there's not something to be nervous about," Huffman, the state environmental chief, told reporters. Freedom is now looking for another place to store the chemical.

Barrett, an assistant managing editor and senior writer at *Bloomberg Businessweek*, is working on a book about the Chevron oil pollution case in Ecuador, which is scheduled for publication by Crown in 2014. His most recent book is *GLOCK: The Rise of America's Gun*.

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# Ex. 5 - Deliberative

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| Date & Time* | Time since start (hr) | Event | Comment |
|---|---|---|---|
| 1/9/14 8:15 | 0.00 | Complaints of odor near Freedom Industries facility | |
| 1/9/14 10:40 | 2.42 | Freedom Industries discovers that MCHM is leaking | The chemical is actually a mixture containing at least 6 constituents, including an odorant reported to smell like licorice. |
| 1/9/14 11:15 | 3.00 | State environmental officials pinpoint the source of the leak | One storage tank was leaking through a hole approximately 1 inch in diameter. Unclear how the State became involved before the leak was reported to the State at 12:05 PM |
| 1/9/14 11:45 | 3.50 | Freedom Industries notifies WV American Water. Plant adds carbon to filters but continues to treat water. | Unclear why GAC was ineffective at contaminant removal (the limited data I saw showed no removal at the Elk River WTP). Both Huntington and GCWW conducted bench-scale studies with PAC and observed removals greater than 80% of MCHM. |
| 1/9/14 12:05 | 3.83 | Freedom Industries reports leak to the State | |
| 1/9/14 16:20 | 8.08 | MCHM detected in finished water | This was probably close to as early as the plant would have discovered that their treatment processes were not removing MCHM (as noted above, they assumed the GAC layer they had on top of a sand filter would remove the contaminant). At this point in the response an Eastman/DuPont lab was using their "percent purity" method to run water samples. My understanding is that this is the in-house method used by DuPont for QC on their product. It still uses the same instrumentation and basic methodology as EPA methods 524 / 8270 (either GC-FID or CG-MS); however, it was not calibrated to dilute aqueous concentrations, and was semi-quantitative at best. Over the next two days, they tweaked the method for the water matrix, developed a calibration curve to make it a quantitative method, and trained a number of analysts. This is the version of the method they rolled out on 1/11 and used for the duration of the response. |
| 1/9/14 18:00 | 9.75 | Do not use notice was issued | The notice was issued about one and a half hours after the plant confirmed that contaminated water was entering the distribution system. This is a pretty good response time. I suspect that they may have started working on a public notification plan earlier in the day (they probably read Jeff's guidance). |
| 1/10/14 8:00 | 23.75 | Federal disaster declaration. FEMA and the National Guard brought in to distribute water. | |

A BDR
[illegible]

Freedom_0006024_0346

| | | | |
|---|---|---|---|
| 1/11/14 8:00 | 47.75 | West Virginia America Water and the State reported that they had a method to detect the contaminant in water. ATSDR/CDC release an official statement that no adverse health effects are expected at concentrations below 1.0 mg/L. | The method used was adapted from a "percent purity method" developed by DuPont/Eastman. It appears that the method is based on EPA method 524 and/or 8270 (both methods for VOCs). It's unclear whether they are using GC-FID, GC-MS, or both. To our knowledge, the method, as applied to MCHM, has not undergone any level of validation. If EPA had been involved, we would have applied the ICLN guidance on validation of laboratory methods for emergency response. ATSDR is supposed to provide documentation to back up the 1.0 mg/L threshold, but I haven't seen it yet. |
| 1/12/14 8:00 | 71.75 | A total of 10 people admitted to the hospital, and 169 treated and released for symptoms that appeared to be linked to MCHM exposures. | Cases started reporting to hospitals on 01/10/14. CDC offered to conduct an epi study, but so far the State hasn't taken them up on the offer. The study described would have explored many of the datastreams we monitor for PHS. |
| 1/13/14 12:30 | 100.25 | Officials report that levels are below 1.0 mg/L and begin lifting the use restriction. Use restrictions were lifted by zones, starting at the zone closest to the plant. The utility posted an interactive map showing which zip codes were cleared. They also issued instructions to building owners with instructions about how to flush their plumbing systems. They cleared hospitals before lifting the use restriction in the surrounding area. | West Virginia America Water and the State developed a sampling and flushing plan. While the plans were not shared with EPA, the basic information about the plans was shared and seemed reasonable. The sampling plan called for collecting 10 samples from each of 175 pressure zones and splitting those samples for analysis at two labs. The utility was very aggressive in lifting the ban - as soon as they had test results indicating concentrations were below 1.0 mg/L (I suspect QA/QC was minimal). |
| 1/13/14 16:00 | 103.75 | Leading edge of the chemical plum reached the confluence of the Kanawha and Ohio Rivers. ORSANC is modeling the flow of the plum and conducting sampling on the Ohio. (www.orsanco.org) | Staff at the utility in Huntington noted that they could smell the odorant in the MCHM mixture. |
| 1/15/14 8:00 | 143.75 | The chemical plum reached Cincinnati and is expected to take 24 hours to pass by. | GCWW closed their intakes as a precautionary measure. They have source water reservoirs with 60 hours of storage capacity. |
| GENERAL NOTE: Aside from FEMA, the National Guard, and ATSDR, federal partners were generally kept at arms length during the response. Furthermore, once they got the 1.0 mg/L number from ATSDR, their role was reduced to receiving data reports showing that concentrations were below 1.0 mg/L. EPA did receive some data from the State as a courtesy, but was not asked to participate in the response or decision making process. | | | |

*: Some times are estimated.

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Centers for Disease Control
and Prevention

January 15, 2014

Secretary Karen Bowling
Office of the Secretary
West Virginia Department of Health and Human Resources
One Davis Square, Suite 100, East
Charleston, West Virginia 25301

Dear Secretary Bowling:

I am writing to provide additional background information on development of a drinking water screening value for the areas of West Virginia impacted by the Elk River MCHM spill. CDC/ATSDR has been pleased to work in close collaboration with the State and various Federal agencies during this response to provide technical assistance on water sampling activities, development of the screening value and public health guidance.

As you know, there are few studies on this specialized chemical. Like many studies done for medical, chemical safety and consumer applications, the only available studies looked at the effects of exposure on animals. Therefore, scientists used the available information about 4-methylcyclohexanemethanol MCHM to calculate how much MCHM a person could likely ingest without resulting in adverse health effects. These calculations use safety factors to take into account the differences between animals and people, and to consider possible effects on special populations. An additional safety factor was applied to account for the limited availability of data. Based on these safety factors and the available research studies, scientists recommended a screening level of 1 part per million (1 ppm) of MCHM in drinking water.

Since making the initial calculations, scientists have obtained additional animal studies about MCHM. These are currently being reviewed. At this time, the scientists continue to recommend 1 ppm as a protective level to prevent adverse health effects. However, due to limited availability of data, and out of an abundance of caution, you may wish to consider an alternative drinking water source for pregnant women until the chemical is at non-detectable levels in the water distribution system.

Scientists from multiple federal agencies are summarizing the currently available MCHM studies. This summary will be posted in the Hazardous Substances Data Bank (HSDB) as soon as it is complete. HSDB is an online, public resource provided by the National Library of Medicine. (http://www.nlm.nih.gov/pubs/factsheets/hsdbfs.html)

We will continue to work closely with your staff to review daily water sampling data. Please feel free to contact me if you have any questions or if we can provide any further assistance.

Sincerely,

Thomas Frieden, MD, MPH
Director

# Ex. 5 - Deliberative

# Ex. 5 - Deliberative

# Ex. 5 - Deliberative

## National Water Information System: Web Interface



**Click to hide News Bulletins**

- December 12, 2013
- Read the Mobile Site Tutorial Try it (http://m.waterdata.usgs.gov) from your mobile device!
- New improved user interface.
- Full News

**Click to hide state-specific text**

- Additional information:
  - Annual Water Data Reports: Water Years 2002-12
  - Historical instantaneous flow data for Virginia: Instantaneous Data Archive - IDA
  - USGS Threatened and Endangered Stations: By State
  - National Weather Service Advanced Hydrologic Prediction Service: River forecasts

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**NOTICE: August 7, 2013**"The U.S. Geological Survey (USGS) will discontinue operation of a number of streamgages nationwide due to budget cuts as a result of sequestration. Additional streamgages may be affected if partners reduce their funding to support USGS streamgages. The USGS is working to identify which streamgages will be impacted and will post this information as it becomes available. Streamgages are used nationwide to predict and address drought and flood conditions by monitoring water availability. The USGS and over 850 Federal, State, and local agencies cooperatively fund the USGS streamgaging network, which consists of over 8,000 streamgages. When budget fluctuations occur, the network is impacted."

# USGS 03197000 ELK RIVER AT QUEEN SHOALS, WV

## PROVISIONAL DATA SUBJECT TO REVISION

**Available data for this site** Time-series: Current/Hist

**LOCATION.**--Lat 38°28'15", long 81°17'03",
referenced to North American Datum of 1927, Kanawha County, WV
on right bank 50 ft upstream from Queen Shoals Creek, 100 ft d
4.0 mi upstream from Big Sandy Creek, and at mile 26.2.
**DRAINAGE AREA.**--1,145 $mi^2$, includes that of Queen Shoals Creek.
**PERIOD OF RECORD.**--October to November 1928 (monthly discharge publi
December 1928 to September 1960 (daily discharge and peaks),
October 1960 to current year (daily discharge and annual maxim
**REVISED RECORDS.**--WSP 783: Drainage area. WSP 1335: 1929-32, 1935(M)
WDR WV-2004-1: 1981-2003(P). WDR-US-2008: 1981-2003.
**GAGE.**--Water-stage recorder with satellite telemeter. Datum of gage
NAVD 88 (VERTCON conversion of 604.09 ft above NGVD 29). Prior
nonrecording gage. June 19, 1932, to Sept. 30, 1946, water-sta
at bridge 100 ft upstream at same datum.
**REMARKS.**--Flow regulated since October 1960 by Sutton Lake.
**PERIOD OF DAILY RECORD (WQ).**--SPECIFIC CONDUCTANCE: February 1985 to
WATER TEMPERATURE: November 1960 to April 1975, February 1985
TURBIDITY: February 1985 to September 1986.
SUSPENDED-SEDIMENT RECORDS: February 1985 to September 1986.
**This gaging station is maintained in cooperation with:**
***U.S. Army Corps of Engineers, Huntington District***
***State of West Virginia***

**Current shift adjusted stage-discharge rating table. These tab delimited frequently. If you use these ratings, it is important that you update ofte**
**What is a shift adjusted stage-discharge rating?**

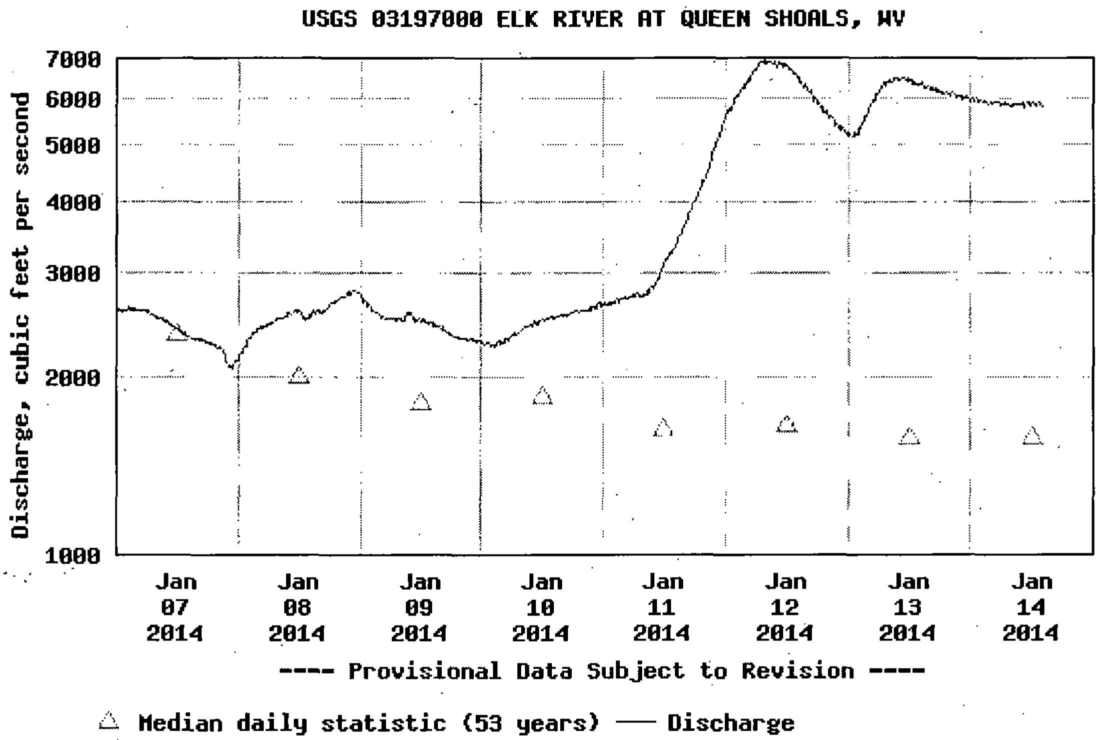
This station managed by the Charleston Field Office.

| Available Parameters | Available Period | | Output format |
|---|---|---|---|
| All 2 Available Parameters for this site | | | Graph |
| 00060 Discharge | 2007-10-01 | 2014-01-14 | Graph w/ stats |
| 00065 Gage height | 2013-09-16 | 2014-01-14 | Graph w/o stats |
| | | | Graph w/ (up to 3) p |
| | | | Table |
| | | | Tab-separated |

**Summary of all available data for this site**
**Instantaneous-data availability statement**

**Discharge, cubic feet per second**

Most recent instantaneous value: 5,830 01-14-2014 14:00 EST

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Create presentation-quality / stand-alone graph. Subscribe to WaterAlert

Share this graph |

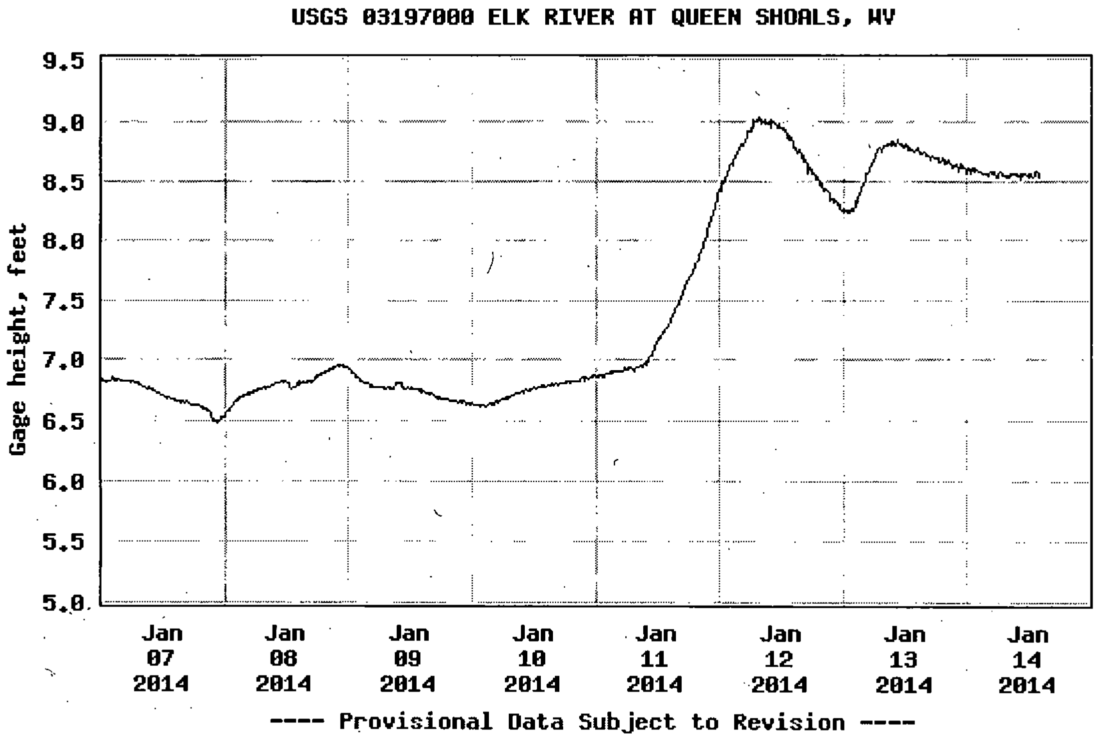
**Daily discharge, cubic feet per second -- statistics for Jan 14 based on 53 years of record** more

| Min (2001) | 25th percen-tile | Median | Mean | 75th percen-tile | Most Recent Instantaneous Value Jan 14 | Max (1963) |
|---|---|---|---|---|---|---|
| 342 | 1010 | 1580 | 2470 | 3580 | 5830 | 8950 |

**Gage height, feet**

Most recent instantaneous value: 8.54 01-14-2014 14:00 EST

Flood stage = 19 ft

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Share this graph |

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Questions about sites/data?
Feedback on this web site
Automated retrievals
Help

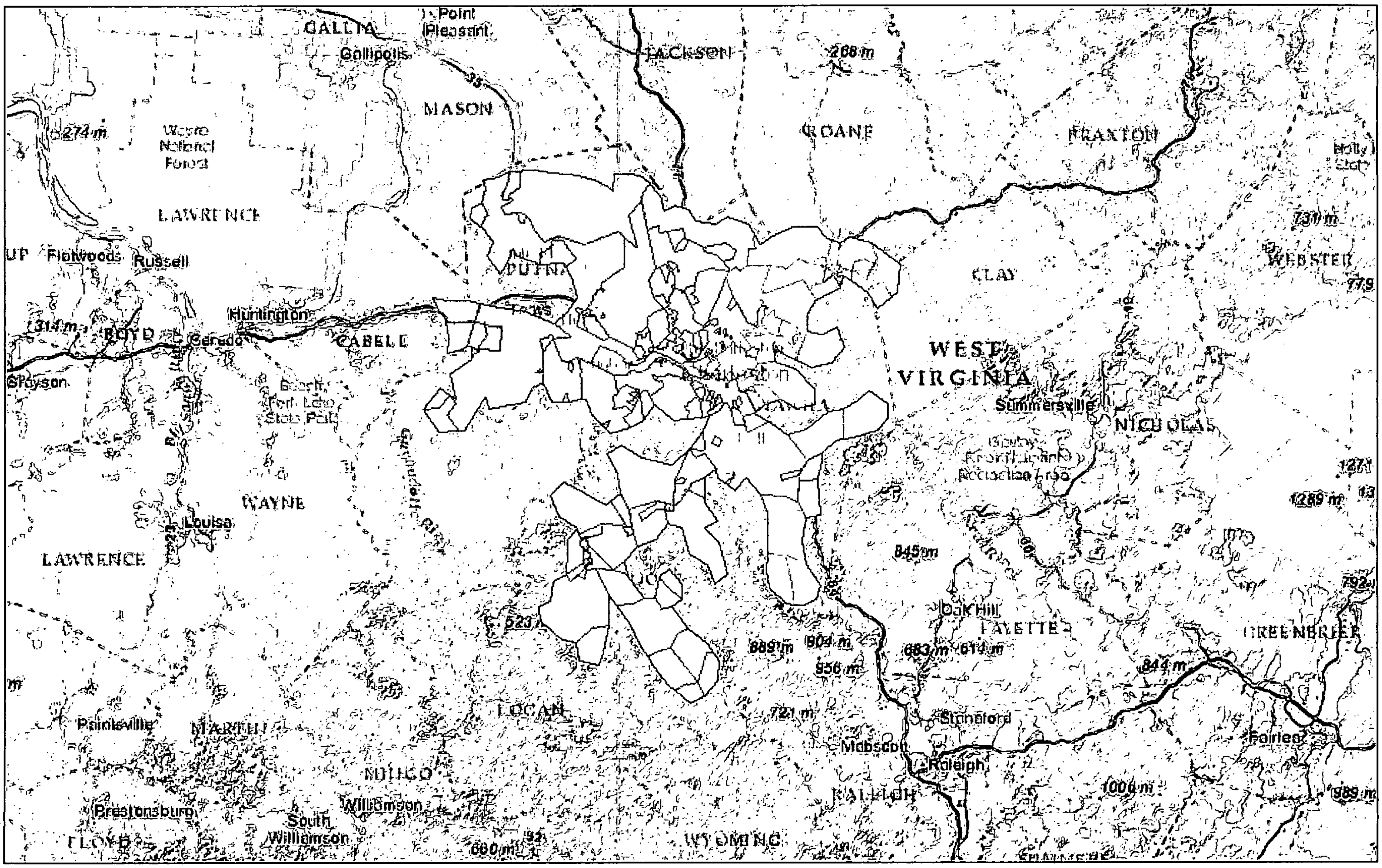
Data Tips
Explanation of terms
Subscribe for system changes
News

Accessibility Plug-Ins FOIA Privacy Policies and Notices
U.S. Department of the Interior | U.S. Geological Survey
**Title: USGS Current Conditions for West Virginia**
**URL: http://waterdata.usgs.gov/wv/nwis/uv?**

USA.gov TAKE PRIDE IN AMERICA

Page Contact Information: West Virginia Water Data Support Team
Page Last Modified: 2014-01-14 15:09:56 EST
0.98 0.85 sdww01

# Kanawha Valley Water Safety Status Map




January 16, 2014

1:1,155,581

0 10 20 40 mi

0 15 30 60 km

Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL.

AMWater

Freedom_0006024_0356

# Ex. 5 - Deliberative

# HOW TO FLUSH YOUR PLUMBING SYSTEM

WEST VIRGINIA AMERICAN WATER

Following are step-by-step procedures customers can use to flush their plumbing system. To protect the health and safety of our communities, we recommend that you read carefully and follow the steps for flushing. Thank you for your cooperation. **NOTE: After flushing, your water filters need to be replaced. If you have any point of entry water treatment system such as a water softener or filter, please refer to "How to Flush Plumbing Appliances and Faucets."**

West Virginia American Water will be offering residential customers a credit of 1000 gallons, which is more than what will likely be required to flush the average residential home. The average residential customer uses approximately 3,300 gallons per month.

## How to flush your plumbing system

**Please complete these steps in the order set out below. Finish each step completely before moving on to the next step.**

1. Flush ALL hot water taps for 15 minutes

Begin the flushing procedure by opening the hot water taps in your bathroom(s). Open ALL hot water lavatory (sink) fixtures, hot water bath fixtures, and any other hot water fixtures, such as kitchens, wet bars, etc. **Run these hot water fixtures for at least 15 minutes. Shut water off after 15 minutes.** After you have flushed each hot water faucet for 15 minutes, your hot water heater will be safe for use.

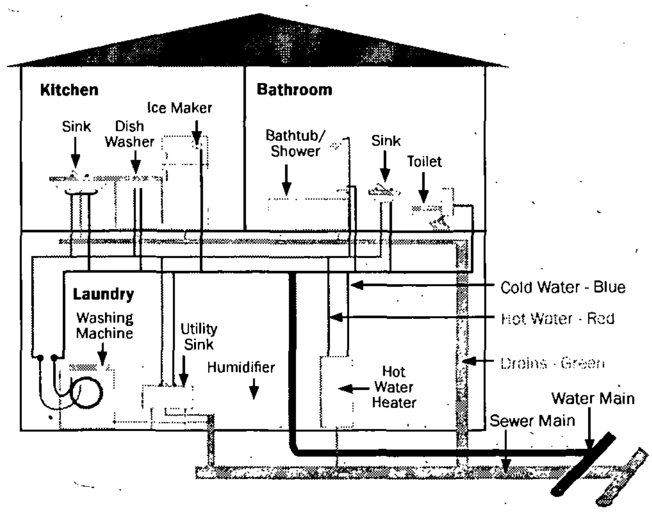
2. Flush ALL cold water taps for five minutes

Once the hot water tank and hot water piping have been flushed, open ALL of the cold water fixtures, flush each toilet at least one time. **Run these cold water fixtures for at least five minutes. Shut water off after five minutes.** This does include the water in your refrigerator water dispenser.

3. Flush ALL remaining faucets and appliances

(Before starting step 3, please see **How to Flush Plumbing Appliances and Faucets** for more information.) Open any remaining fixtures such as hose bibs, external faucets or fixtures not used for drinking for at least five minutes to finish the plumbing system flushing. Take additional steps to remove water from other appliances. See **How to Flush Plumbing Appliances and Faucets** for more information. This includes:

- Ice makers
- Dishwashers
- Washing machine
- Humidifiers
- Continuous Positive Airway Pressure (CPAP)
- Oral, medical or health care devices
- Baby formula, food and drinks made with water during DO NOT USE
- Water filters
- Water softeners
- Reverse osmosis units




**Any lingering smell, which is expected, is not a health issue.**

For more information: Please contact our 24-Hour Customer Service Center at 1-800-685-8660 or visit our website at **www.westvirginiaamwater.com.**

# HOW TO FLUSH PLUMBING APPLIANCES AND FAUCETS

WEST VIRGINIA AMERICAN WATER

Once you've flushed your hot and cold water faucets, be sure to take these additional steps to flush plumbing appliances. To protect the health and safety of our communities, we recommend that you read carefully and follow the steps for flushing. Thank you for your cooperation.

- **Ice makers**
  If you have an ice maker in your refrigerator, first throw away all ice and then:

  **If you have a filter on your ice maker:**
  Some refrigerators, which have ice makers, also have filters on the small water line that feed the ice maker. If you have or use filters on your ice maker, you want to replace the filter **AFTER** flushing your refrigerator's ice maker. These filters require routine replacement. This would be a good time to replace the filter to ensure that the water line to the ice maker is completely flushed. Some refrigerators also provide filtered cold water. Check to make sure that you have replaced any filter **AFTER** flushing that is associated with the cold water supply. Then flush cold-water dispenser for five minutes.
- After flushing all of the other plumbing, let the ice maker container fill up completely and discard this ice and clean the container before replacing. If you have more than one refrigerator make sure you perform the same procedure on those units as well.
- **Dishwashers and washing machines-**
  Dishes and clothes that were washed during the DO NOT USE order should be rewashed. After flushing hot water pipes and water heater, run dishwasher and washing machine empty one time.
- **Humidifiers, CPAP and other devices**
  Throw away any water used in humidifiers, Continuous Positive Airway Pressure (CPAP), oral, medical or healthcare devices, and rinse the device with clean water.
- **Baby formula, food or drinks made with water during the DO NOT USE**
  Be sure you have thrown away any baby formula or other foods prepared with water on the days of the DO NOT USE. This includes drinks like Gatorade made with powder or concentrate.
- **Water filters**
  Clean or change your water filter, or contact the filter manufacturer for more details.
- **Water supplies for pets**
  Pets need clean water too. Be sure to empty all water bowls, bottles, or other water supplies for your pet. After flushing your water system, wash the pet bowl, bottle or other water supply. Then refill with tap water.
- **Point of entry/point of use devices (this may not apply to all customers)**
  If you have a Point of Entry water treatment system such as a water softener or filter, which all of the home's water passes through before it enters the main plumbing system, you should consider the following general guidelines before completing your household plumbing flushing.

*(Continued on page 3)*

**For more information**

Please contact our 24-Hour Customer Service Center at 1-800-685-8660 or visit **www.westvirginiaamwater.com**.

# HOW TO FLUSH PLUMBING APPLIANCES AND FAUCETS

WEST VIRGINIA AMERICAN WATER

- **Water softeners:** Household water softener, which uses a natural or synthetic resin material to exchange sodium for calcium and magnesium present in the water, should be manually regenerated before flushing your plumbing system. This will ensure that the softener resin has been backwashed and cleaned before flushing procedures begin. If you are unsure of how to manually initiate a regeneration cycle, refer to your softener owner's manual or call you equipment supplier for assistance.
- **Sediment Filters:** Household water filters usually fall in two basic categories:
  - Pressure filters, which can be backwashed to clean
  - Cartridge filters; which have a replaceable element or cartridge

  If your home has a pressure filter that can be backwashed, you should initiate a manual backwash of the filter before proceeding with, and after completing, the flushing procedures. If you have a whole house cartridge filter system, you should replace the cartridges after completing the flushing procedures.
- **Point of use filters/treatment:** If you have or use Point of Use filters, which are typically attached to your kitchen faucet you should replace the filter before using the faucet-connected unit. These filters require periodic replacement anyway so this would be a good time to do this.
- **Reverse Osmosis:** Reverse Osmosis drinking water treatment systems often have pre-filters, which you may want to replace before flushing the RO System. However the actual Reverse Osmosis membrane module should not require replacement. If the manufacturer of the membrane suggests that you replace this part of the system you should ask them to give you the specific reasons why.

**For more information**

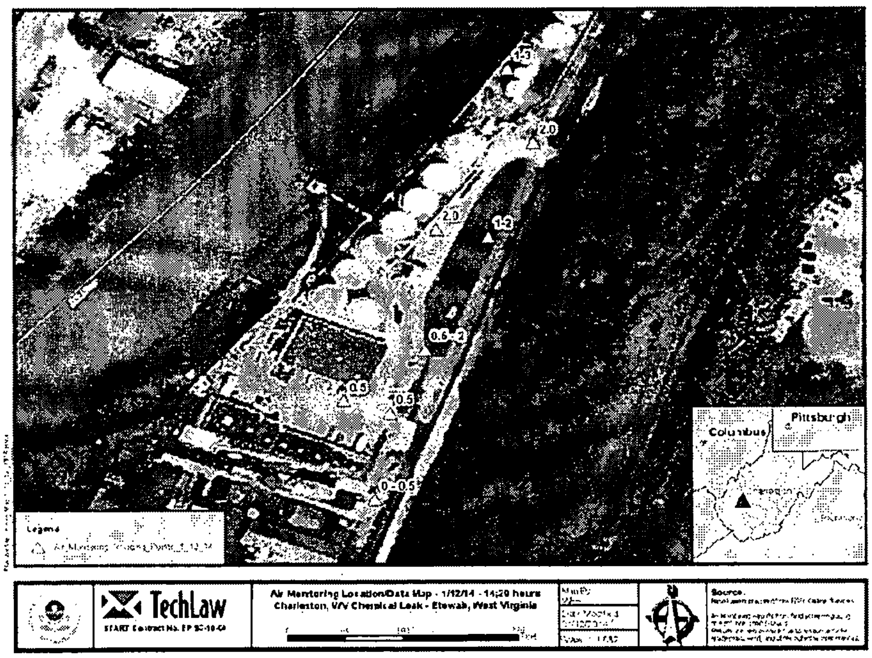
Please contact our 24-Hour Customer Service Center at 1-800-685-8660 or visit our website at **www.westvirginiaamwater.com**.

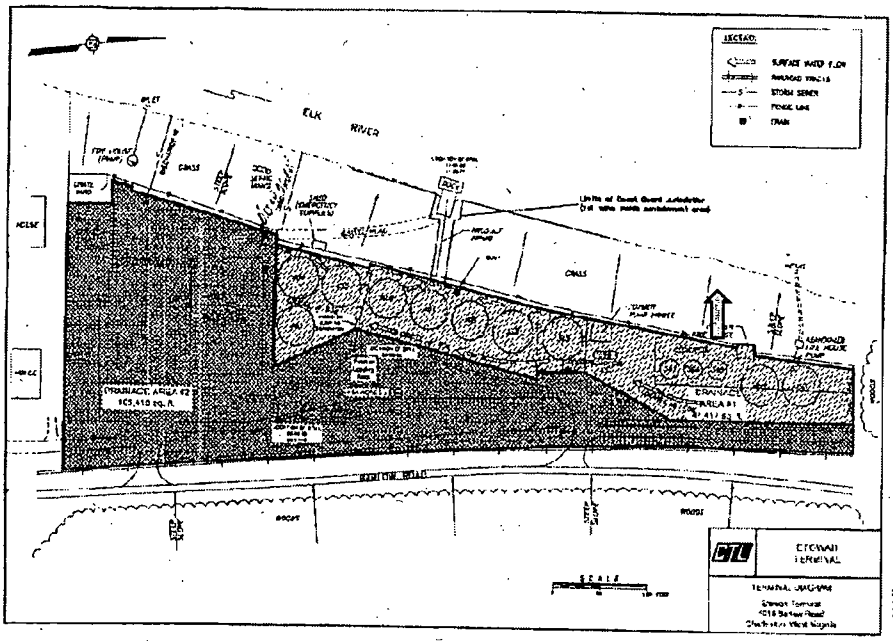
01-12-2014

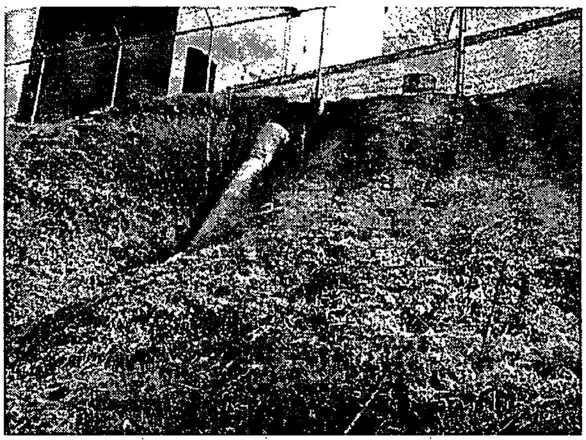
# OPS Briefing

0900

January 13, 2014





Storm drain below the second containment of tank farm

## Example of Fill below Tank Farm

The yellow brick seen in this picture is just one layer of fill used.

- There is a layer of red brick from demolished buildings
- Some tile from buildings are used
- The secondary containment does have a clay liner below the fill and gravel layers

- Freedom Industries will be drilling two holes to look at what the layers of fill are specifically and the depth of each, once the issue with marking gas lines is resolved.

# Ex. 5 - Deliberative

Jan. 10, 2014

Environmental Protection Agency

Dear FOIA Officer:

Pursuant to the federal Freedom of Information Act, 5 U.S.C. § 552, I request the following information:

1.) Any email or written correspondence regarding the January 2014 leak at the Freedom Industries Inc. facility in Charleston, W.V. The facility address is 1015 Barlow Drive, Charleston, WV 25311. The leak occurred sometime during the week of Jan. 5, 2014.
2.) Any inspection, incident or narrative reports describing the above-mentioned leak.
3.) Any inspection, enforcement or regulatory actions taken against Freedom Industries Inc.
4.) Any plans or documents filed by Freedom Industries Inc. to comply with the Spill Prevention, Control and Countermeasure Rule.
5.) Any plans or documents filed by Freedom Industries Inc. to comply with the Emergency Planning and Community Right To Know Act.
6.) Any plans or documents concerning Freedom Industries Inc. that were filed in compliance with above-ground storage tank rules.

I would like to receive the information in electronic format.

These records are likely located both at the EPA's headquarters office and its Region 3 offices.

I am making this request as a reporter with The Associated Press and this request is made as part of newsgathering and not for commercial use. As a representative of the news media I am only required to pay for the direct cost of duplication after the first 100 pages.

I ask that you waive any and all applicable fees associated with this request. Through this request, I am gathering information on an ongoing public safety and environmental emergency affecting the residents of Charleston, W.V. Release of this information is in the public interest because it will contribute significantly to public understanding of government operations and activities, particularly government oversight of hazardous chemicals and the safety of a public drinking water supply. If you deny this request for a fee waiver, please advise me in advance of the estimated charges if they are to exceed $50.

If my request is denied in whole or part, I ask that you justify all deletions by reference to specific exemptions of the Act. I will also expect you to release all segregable portions of otherwise exempt material. I reserve the right to appeal your decision to withhold any information or to deny a waiver of fees.

I also ask that you provide expedited review of this request which concerns a matter of urgency. The information sought relates to a currently unfolding story, specifically, the leak of a hazardous chemical into the water supply of Charleston, W.V. Second, delaying release of the information harms the public interest in knowing what actions are being taken to protect the health of thousands of people who have been exposed or could be exposed to this pollution. Hospitals report that several people may have already been sickened. Third, the request obviously concerns federal government activity, as the request seeks information on a potential violation of the Clean Water Act. Finally, as the world's oldest and largest news organization, the AP is a credible requester. I certify that my statements concerning the need for expedited review are true and correct to the best of my knowledge and belief.

If you deny expedited processing, I expect to receive a response to the request within 20 business days, as the statute requires.

As I am making this request as a journalist and the information is of timely value, I would appreciate your communicating with me by telephone Ex. 6 - Personal Privacy or e-mail [Ex. 6 - Personal Privacy, rather than by mail, if you have questions regarding this request

Finally, I note that President Obama's January 21, 2009 "Presidential Memorandum for the Heads of Executive Departments and Agencies on the Freedom of Information Act" specifically stated that "[i]n responding to requests under the FOIA, executive branch agencies should act promptly and in a spirit of cooperation, recognizing that such agencies are servants of the public." Moreover, it held that "[a]ll agencies should adopt a presumption in favor of disclosure, in order to renew their commitment to the principles embodied in FOIA, and to usher in a new era of open Government. The presumption of disclosure should be applied to all decisions involving FOIA."

In the spirit of such cooperation and the presumption of disclosure, I look forward to your prompt response.

Thank you for your assistance.

Sincerely,

Ex. 6 - Personal Privacy

The Ohio River Valley Water Sanitation Commission (ORSANCO) is monitoring the movement of the Elk River spill, as it flows into and along the Ohio River. The chemical 4-methycyclohexane methnol, known at MCHM, was released into the Elk River, which flows into the Kanawha River, which flows into the Ohio River.

MCHM has been detected in the Ohio River. It was first detected in the Ohio River on Sunday, January 12th at noon. ORSANCO is coordinating with multiple organizations, including Greater Cincinnati Water Works, Northern Kentucky Water, Kentucky Division of Water, US Coast Guard, West Virginia American Water and others to monitor the location of the spill. Field crew members at these organizations are taking water samples of the Ohio River to determine the concentration of the chemical. The sample information is used by these organizations to present the most accurate understanding of the Elk River spill and to protect drinking water use.

***As of 5:00 AM, Tuesday, January 14, 2014, the chemical's odor was detected at Maysville, which is located at Ohio River Mile 407.8. ORSANCO estimates that the leading edge of the spill is at Meldhal Locks, which is located at Ohio River Mile 436.2. Cincinnati is located at Ohio River Mile 463.5.*

If residents in the Cincinnati area have questions about their water, they may contact Cincinnati Water Works at (513) 591-7700 or Northern Kentucky Water staff Mary Carol Wagner at (859) 547-3293 or Richard Harrison at (859) 578-5458.

## Kanetsky, Charles

**From:** Jerry Schulte [jschulte@orsanco.org]
**Sent:** Wednesday, January 15, 2014 8:47 AM
**To:** Kanetsky, Charles
**Subject:** Spill Data
**Attachments:** MCHM_Conc_2014.xlsx

Chuck-
It's been a whirlwind, as always during these types of events. Due to the speed of the river and lack of analytical capacity, we don't have a whole lot of data on the plume. Attached is a graph generated from one of ORSANCO's Organics Detection System monitoring sites at Huntington, WV, Ohio River mile 304, which was the first location on the Ohio River to see the plume. They successfully treated with activated carbon.

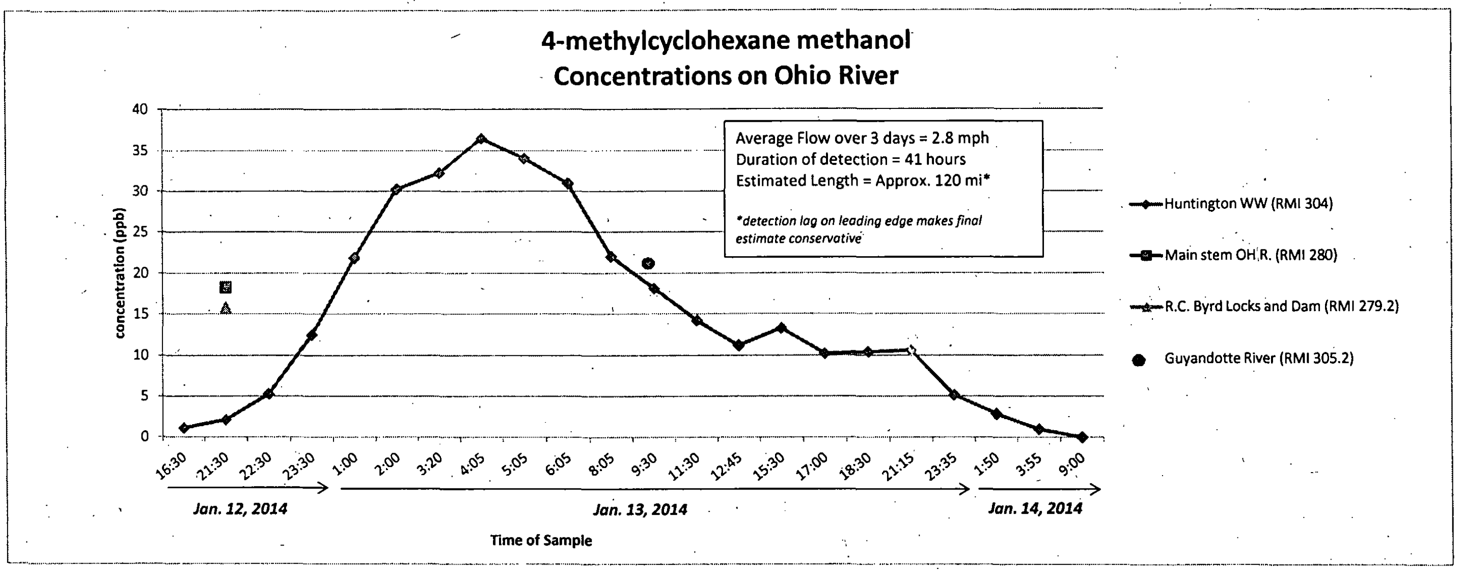
The leading edge of the plume arrived at Meldahl Locks and Dam, Ohio River mile 436, at approximately 9:00pm last night. We anticipate it will take 24 hours for the bulk of the plume to pass. The river velocity for Cincinnati, which is just downstream from Meldahl, is 3.6 mph, which makes the "bulk" of the plume roughly 86 miles long.

Let me know if you need anything else. We will be posting updates on our website.

Jerry

**Jerry G. Schulte**
Manager, Source Water Protection and Emergency Response
Ohio River Valley Water Sanitation Commission, ORSANCO
5735 Kellogg Ave.
Cincinnati, Ohio 45230
www.orsanco.org
www.facebook.com/ORSANCO
Office: 513.231.7719 ext 104
Mobile: 513.260.8249

| RMI | Date | Time | Conc. (ppb) | | | | | | | area under the curve |
|---|---|---|---|---|---|---|---|---|---|---|
| 304 | 1/12/2014 | 16:30 | 1.12 | 1 | 1.00 | | 0.00 | 1.00 | 1.12 | 8.175 |
| 304 | 1/12/2014 | 21:30 | 2.15 | 5:00 | 5.00 | | 5.00 | 6.00 | 2.15 | 3.715 |
| 304 | 1/12/2014 | 22:30 | 5.28 | 1:00 | 1.00 | | 1.00 | 7.00 | 5.28 | 8.895 |
| 304 | 1/12/2014 | 23:30 | 12.51 | 1:00 | 1.00 | | 1.00 | 8.00 | 12.51 | 31.515 |
| 304 | 1/13/2014 | 1:00 | 21.87 | 1:50 | 1.00 | 0.833333 | 1.83 | 9.83 | 21.87 | 26.075 |
| 304 | 1/13/2014 | 2:00 | 30.28 | 1:00 | 1.00 | | 1.00 | 10.83 | 30.28 | 41.693 |
| 304 | 1/13/2014 | 3:20 | 32.26 | 1:20 | 1.00 | 0.333333 | 1.33 | 12.17 | 32.26 | 25.781 |
| 304 | 1/13/2014 | 4:05 | 36.49 | 0:45 | | 0.75 | 0.75 | 12.92 | 36.49 | 35.270 |
| 304 | 1/13/2014 | 5:05 | 34.05 | 1:00 | 1.00 | | 1.00 | 13.92 | 34.05 | 32.525 |
| 304 | 1/13/2014 | 6:05 | 31 | 1:00 | 1.00 | | 1.00 | 14.92 | 31 | 53.040 |
| 304 | 1/13/2014 | 8:05 | 22.04 | 2:00 | 2.00 | | 2.00 | 16.92 | 22.04 | 28.482 |
| 304 | 1/13/2014 | 9:30 | 18.17 | 1:25 | 1.00 | 0.416667 | 1.42 | 18.33 | 18.17 | 32.400 |
| 304 | 1/13/2014 | 11:30 | 14.23 | 2:00 | 2.00 | | 2.00 | 20.33 | 14.23 | 15.888 |
| 304 | 1/13/2014 | 12:45 | 11.19 | 1:15 | 1.00 | 0.25 | 1.25 | 21.58 | 11.19 | 33.674 |
| 304 | 1/13/2014 | 15:30 | 13.3 | 2:45 | 2.00 | 0.75 | 2.75 | 24.33 | 13.3 | 17.663 |
| 304 | 1/13/2014 | 17:00 | 10.25 | 1:30 | 1.00 | 0.5 | 1.50 | 25.83 | 10.25 | 15.495 |
| 304 | 1/13/2014 | 18:30 | 10.41 | 1:30 | 1.00 | 0.5 | 1.50 | 27.33 | 10.41 | 28.916 |
| 304 | 1/13/2014 | 21:15 | 10.62 | 2:45 | 2.00 | 0.75 | 2.75 | 30.08 | 10.62 | 18.398 |
| 304 | 1/13/2014 | 23:35 | 5.15 | 2:20 | 2.00 | 0.333333 | 2.33 | 32.42 | 5.15 | 5.006 |
| 304 | 1/14/2014 | 1:50 | 2.86 | 1:15 | 1.00 | 0.25 | 1.25 | 33.67 | 2.86 | 4.010 |
| 304 | 1/14/2014 | 3:55 | 0.99 | 2:05 | 2.00 | 0.083333 | 2.08 | 35.75 | 0.99 | 2.516 |
| 304 | 1/14/2014 | 9:00 | 0 | 5:05 | 5.00 | 0.083333 | 5.08 | 40.83 | 0 | 0.000 |
| 280 | 1/12/2014 | 21:52 | 18.3 | | | | | | | |
| 279.2 | 1/12/2014 | 21:36 | 15.91 | | | | | | | 469.133 |
| 305.2 | 1/13/2014 | 9:15 | 21.04 | | | | | | | |


4-methylcyclohexane methanol
Concentrations on Ohio River
Average Flow over 3 days = 2.8 mph
Duration of detection = 41 hours
Estimated Length = Approx. 120 mi*
*detection lag on leading edge makes final estimate conservative
concentration (ppb)
0
5
10
15
20
25
30
35
40
16:30
21:30
22:30
23:30
1:00
2:00
3:20
4:05
5:05
6:05
8:05
9:30
11:30
12:45
15:30
17:00
18:30
21:15
23:35
1:50
3:55
9:00
Jan. 12, 2014
Jan. 13, 2014
Jan. 14, 2014
Time of Sample
Huntington WW (RMI 304)
Main stem OH R. (RMI 280)
R.C. Byrd Locks and Dam (RMI 279.2)
Guyandotte River (RMI 305.2)

**Ex. 5 - Deliberative**

# Ex. 5 - Deliberative

# HOW TO FLUSH YOUR PLUMBING SYSTEM

WEST VIRGINIA AMERICAN WATER

Following are step-by-step procedures customers can use to flush their plumbing system. To protect the health and safety of our communities, we recommend that you read carefully and follow the steps for flushing. Thank you for your cooperation. **NOTE: After flushing, your water filters need to be replaced. If you have any point of entry water treatment system such as a water softener or filter, please refer to "How to Flush Plumbing Appliances and Faucets."**

West Virginia American Water will be offering residential customers a credit of 1000 gallons, which is more than what will likely be required to flush the average residential home. The average residential customer uses approximately 3,300 gallons per month.

## How to flush your plumbing system

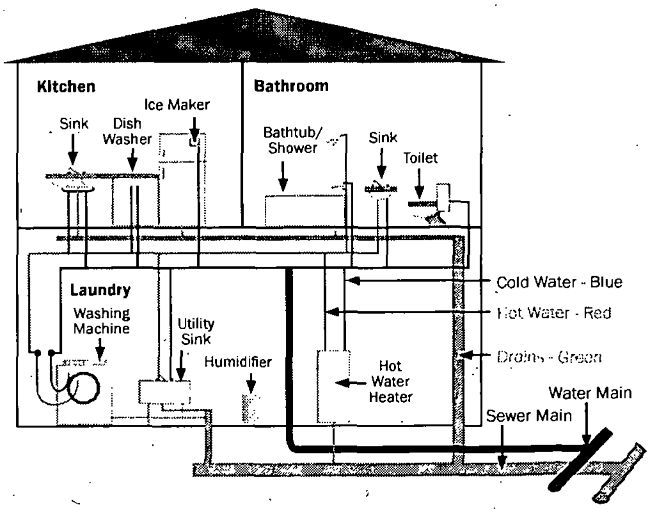
**Please complete these steps in the order set out below. Finish each step completely before moving on to the next step.**

1. **Flush ALL hot water taps for 15 minutes**
   Begin the flushing procedure by opening the hot water taps in your bathroom(s). Open ALL hot water lavatory (sink) fixtures, hot water bath fixtures, and any other hot water fixtures, such as kitchens, wet bars, etc. **Run these hot water fixtures for at least 15 minutes. Shut water off after 15 minutes.** After you have flushed each hot water faucet for 15 minutes, your hot water heater will be safe for use.

2. **Flush ALL cold water taps for five minutes**
   Once the hot water tank and hot water piping have been flushed, open ALL of the cold water fixtures, flush each toilet at least one time. **Run these cold water fixtures for at least five minutes. Shut water off after five minutes.** This does include the water in your refrigerator water dispenser.

3. **Flush ALL remaining faucets and appliances**
   (Before starting step 3, please see **How to Flush Plumbing Appliances and Faucets** for more information.) Open any remaining fixtures such as hose bibs, external faucets or fixtures not used for drinking for at least five minutes to finish the plumbing system flushing. Take additional steps to remove water from other appliances. See **How to Flush Plumbing Appliances and Faucets** for more information. This includes:

- Ice makers
- Dishwashers
- Washing machine
- Humidifiers
- Continuous Positive Airway Pressure (CPAP)
- Oral, medical or health care devices
- Baby formula, food and drinks made with water during DO NOT USE
- Water filters
- Water softeners
- Reverse osmosis units




**Any lingering smell, which is expected, is not a health issue.**

**For more information:** Please contact our 24-Hour Customer Service Center at 1-800-685-8660 or visit our website at **www.westvirginiaamwater.com**.

# HOW TO FLUSH PLUMBING APPLIANCES AND FAUCETS

WEST VIRGINIA AMERICAN WATER

Once you've flushed your hot and cold water faucets, be sure to take these additional steps to flush plumbing appliances. To protect the health and safety of our communities, we recommend that you read carefully and follow the steps for flushing. Thank you for your cooperation.

- **Ice makers**
  If you have an ice maker in your refrigerator, first throw away all ice and then:

  **If you have a filter on your ice maker:** Some refrigerators, which have ice makers, also have filters on the small water line that feed the ice maker. If you have or use filters on your ice maker, you want to replace the filter **AFTER** flushing your refrigerator's ice maker. These filters require routine replacement. This would be a good time to replace the filter to ensure that the water line to the ice maker is completely flushed. Some refrigerators also provide filtered cold water. Check to make sure that you have replaced any filter **AFTER** flushing that is associated with the cold water supply. Then flush cold-water dispenser for five minutes.
- After flushing all of the other plumbing, let the ice maker container fill up completely and discard this ice and clean the container before replacing. If you have more than one refrigerator make sure you perform the same procedure on those units as well.
- **Dishwashers and washing machines-**
  Dishes and clothes that were washed during the DO NOT USE order should be rewashed. After flushing hot water pipes and water heater, run dishwasher and washing machine empty one time.
- **Humidifiers, CPAP and other devices**
  Throw away any water used in humidifiers, Continuous Positive Airway Pressure (CPAP), oral, medical or healthcare devices, and rinse the device with clean water.
- **Baby formula, food or drinks made with water during the DO NOT USE**
  Be sure you have thrown away any baby formula or other foods prepared with water on the days of the DO NOT USE. This includes drinks like Gatorade made with powder or concentrate.
- **Water filters**
  Clean or change your water filter, or contact the filter manufacturer for more details.
- **Water supplies for pets**
  Pets need clean water too. Be sure to empty all water bowls, bottles, or other water supplies for your pet. After flushing your water system, wash the pet bowl, bottle or other water supply. Then refill with tap water.
- **Point of entry/point of use devices (this may not apply to all customers)**
  If you have a Point of Entry water treatment system such as a water softener or filter, which all of the home's water passes through before it enters the main plumbing system, you should consider the following general guidelines before completing your household plumbing flushing.

*(Continued on page 3)*

**For more information**

Please contact our 24-Hour Customer Service Center at 1-800-685-8660 or visit **www.westvirginiaamwater.com.**

# HOW TO FLUSH PLUMBING APPLIANCES AND FAUCETS

WEST VIRGINIA AMERICAN WATER

- **Water softeners:** Household water softener, which uses a natural or synthetic resin material to exchange sodium for calcium and magnesium present in the water, should be manually regenerated before flushing your plumbing system. This will ensure that the softener resin has been backwashed and cleaned before flushing procedures begin. If you are unsure of how to manually initiate a regeneration cycle, refer to your softener owner's manual or call you equipment supplier for assistance.
- **Sediment Filters:** Household water filters usually fall in two basic categories:
  - Pressure filters, which can be backwashed to clean
  - Cartridge filters, which have a replaceable element or cartridge

  If your home has a pressure filter that can be backwashed, you should initiate a manual backwash of the filter before proceeding with, and after completing, the flushing procedures. If you have a whole house cartridge filter system, you should replace the cartridges after completing the flushing procedures.
- **Point of use filters/treatment:** If you have or use Point of Use filters, which are typically attached to your kitchen faucet you should replace the filter before using the faucet-connected unit. These filters require periodic replacement anyway so this would be a good time to do this.
- **Reverse Osmosis:** Reverse Osmosis drinking water treatment systems often have pre-filters, which you may want to replace before flushing the RO System. However the actual Reverse Osmosis membrane module should not require replacement. If the manufacturer of the membrane suggests that you replace this part of the system you should ask them to give you the specific reasons why.

**For more information**

Please contact our 24-Hour Customer Service Center at 1-800-685-8660 or visit our website at **www.westvirginiaamwater.com**.

01-12-2014

# Ex. 5 - Deliberative

# Ex. 5 - Deliberative

# Ex. 5 - Deliberative

# Ex. 5 - Deliberative

## binetti, victoria

**From:** Arguto, William
**Sent:** Friday, January 10, 2014 10:36 AM
**To:** binetti, victoria; Wisniewski, Patti-Kay
**Subject:** RE: Freedom Chemical Spill - RICT Mtg./Conference Call

**Importance:** High

Thankfully – safe as well!

Just talked to Walt – briefly He will try to call you back. I asked what help he needed and he would like assistance in assessing the what levels would be safe from a DW perspective, Ex. 5 - Deliberative Ex. 5 - Deliberative

Talk to you soon

Other info Walt mentioned. The utility added activated Carbon until the contaminated broke through Small tank farm and the co did not have a good idea of what they had stored and what was lost. I had asked if they had an idea on how much was released?

**From:** binetti, victoria
**Sent:** Friday, January 10, 2014 10:16 AM
**To:** Capacasa, Jon; Arguto, William
**Subject:** Re: Freedom Chemical Spill - RICT Mtg./Conference Call

YAY I'm at the parking garage. See you soon!--V

**From:** Capacasa, Jon
**Sent:** Friday, January 10, 2014 9:53:33 AM
**To:** binetti, victoria; Arguto, William
**Subject:** FW: Freedom Chemical Spill - RICT Mtg./Conference Call

Agenda for RICT

**From:** Matsinger, Josie
**Sent:** Friday, January 10, 2014 9:51 AM
**To:** Aquino, Marcos; Armstead, John A.; Beers, Samantha; Borsellino , Ron; Burns, Francis; Capacasa, Jon; D'Andrea, Michael; DiPasquale, Nicholas; Esher, Diana; Fala, Geoffrey; Garvin, Shawn; Goodwin, Jada; Heston, Gerald; Hodgkiss, Kathy; Libertz, Catherine; Marzulli, Linda; Matsinger, Josie; Mulkey, Marcia; Pomponio, John; Rodriguez, Norman; Schadel, Chuck; Steuteville, William; Tate, Rita; Werner, Lora; White, Terri-A; Wisniewski, Patti-Kay; Wright, Dave
**Cc:** Matlock, Dennis; Linden, melissa
**Subject:** Freedom Chemical Spill - RICT Mtg./Conference Call

Follow-up Information:
Location: RRC/EOC
Call in: Ex. 6 - Personal Privacy
Code: 2
Time: 1100 hrs

Chair: Karen Melvin
Roll Call
Overview of incident and Status of Response - Fran Burns/Dave Wright
Update: OSC Matlock and OPR Coordination Activities -
Update: Water Treatment Plant Status - Patty Wisniewski
Media/Congressional Interest
Action Items

**BACKGROUND:** Yesterday, there was a chemical spill from Freedom Industries, which is an old Pennzoil Refinery. The spilled chemical was 4-methylcyclohexane methanol, which is used in coal preparation and processing. Spill into the ELK River occurred sometime earlier in the day and there was an early report of an odor. The Gov of WV declared a state of emergency for at least five counties. The Kanawha Valley Water Treatment Plant detected the chemical even after the increased carbon treatment effort.

WV issued an order to not drink cook or bathe in the water, which affects approximately 100,000 people. WV is conducting additional water sampling. The Civil Support Team is also deployed to the WVEOC to assist in supplying water to residents. The WV EOC is operational but have not requested EPA assistance. OSC Dennis Matlock has contacted WV DEP Mike Dorsey and offered EPA assistance.

**CURRENT ACTIVITIES:** EPA OSCs Matlock and Linden are enroute to Charleston with START contractor to assist in any sampling activities if requested. They have been in contact with FEMA and will meet up with the IMAT (incident management assistance team) upon his arrival. In anticipation that we will need to staff the ESF-10 desk at the FEMA Region 3 Regional Response Coordination Center (RRCC), the RRC has sent a request for availability to the RSC membership for volunteers to serve as Watchstander at the FEMA offices here in Philadelphia. Until 7:00 pm this evening, Fred MacMillan from HSCD is scheduled to staff the ESF-10 desk.

As always, we will follow the RICT protocols for deployment of any RSC staff which includes: 1) reminding the RSC members to discuss with their supervisor their interest prior to volunteering; 2) obtaining Deputy Director approval/clearance prior to deployment; and, 3) checking with ORC on whether the employee to be deployed is needed for any enforcement matters.

## Kanetsky, Charles

**From:** Toomey, William J [William.J.Toomey@wv.gov]
**Sent:** Tuesday, January 14, 2014 1:05 PM
**To:** Kanetsky, Charles
**Cc:** Rodeheaver, Scott J; Ivey, Walter M
**Subject:** FW: Kanawha River Spill Update

Information from Jerry Schulte from Sunday concerning the Kanawha River and Ohio River.

**From:** Jerry Schulte [mailto:jschulte@orsanco.org]
**Sent:** Sunday, January 12, 2014 5:42 PM
**To:** Peter Tennant; Mike Baker; Mike Eggert; Sherron, Michael; Jim Mehl; Robert Francis; Dorsey, Mike H; Ashland Water - Bill Stambaugh; Russell Water - Frank Stephenson; Ironton Water - Ryan Watts; Portsmouth Water - Sam Sutherland; Portsmouth Water - Laura Roberts; Gregory England; Maysville Water - Darren Garrison; Travis Luncan; East Liverpool Keith Clark; Jason Heath; Huntington Water - Sandy Johnson; Mary Carol Wagner; GCWW - Bruce Whitteberry; GCWW - Richard (Rich) Stuck; Richard Harrison; Dennis Matlock; Julie Roney; Toomey, William J; Jack Wang; Rengao Song; Mandirola, Scott G
**Subject:** Kanawha River Spill Update

Water samples collected today identified the location of the 4-Methylcyclohexane Methanol in the Ohio River. The chemical was spilled to the Elk River, then traveled 58 miles down the Kanawha River to the Ohio. The Kanawha joins the Ohio River at Ohio river mile 265.6.

A river water sample collected at 12:30pm from the confluence of the Ohio and Kanawha rivers found the chemical at 0.112 ppm; a sample collected at the same time from R.C. Byrd locks and dam at river mile 279.2, found the chemical at a concentration of 0.028 ppm. Field reports indicate the substance was readily noticeable by smell at both locations. A threshold odor value of 0.1 ppm has been referenced during this event, however, field observations indicate the value may be lower than this.

Downstream drinking water utilities have been notified and will be updated with information as it becomes available.

Velocities for the Ohio River at Huntington are as follows: today, 1/12 - 2.4mph; tomorrow, 1/13 - 3.2, and Tuesday, 1/14 - 3.2. Due to the recent rains, predicting times of arrival is difficult, at best. We will continue to update this information as possible.

ORSANCO's ODS equipment has been calibrated or otherwise modified to detect, and at many locations, quantify the compound.

More to follow.

--
Jerry G. Schulte, Manager
Source Water Protection and Emergency Response
5735 Kellogg Ave.
Cincinnati, Ohio 45230
Ph. 513.231.7719
Fx. 513.231.7761
Cell 513.260.8249

3302016

STATE OF WEST VIRGINIA
**DEPARTMENT OF HEALTH AND HUMAN RESOURCES**
**BUREAU FOR PUBLIC HEALTH**
**OFFICE OF ENVIRONMENTAL HEALTH SERVICES**

**Joe Manchin III**
**Governor**

**Martha Yeager Walker**
**Secretary**

August 25, 2006

WVAWC-KANAWHA VALLEY DIST
HOLBROOK, THOMAS W
P O BOX 1906
CHARLESTON, WV 25327

**RE: WVAWC-KANAWHA VALLEY DIST**
**PWSID WV3302016, Kanawha County**

Dear Mr. Holbrook:

Your local Source Water Assessment and Protection (SWAP) emergency/contingency and local management activities has been received and reviewed. In the future, as your water system SWAP program progresses, a more formal management plan may be developed.

If you have any questions, please contact me at 304-558-6713.

Sincerely,

J. Scott Rodehaver

J. Scott Rodehaver, Assistant Manager
Source Water Assessment and Protection Program
Environmental Engineering Division

JSR/cjj

RECEIVED AUG 10 2006 By

# SURFACE SYSTEMS - EMERGENCY/CONTINGENCY AND LAND MANAGEMENT PLAN

**(Please Keep a Copy for Your Files)**

PLEASE CHECK APPROPRIATE ITEM(S). PRINT OR TYPE AND ATTACH ADDITIONAL SHEETS IF NEEDED.

System Name: West Virginia American Water-Kanawha Valley District County: Kanawha
Address: 1600 Pennsylvania Avenue PWSID#: WV3302016
Charleston, WV 25302 Date: 8-10-2006
Telephone: 304-340-2036 Fax: 304-345-4963 Email: rboggess@wvawater.com

1. The water users will be notified of a water emergency by:
Word-of-mouth ___ Posted notices ___ Door-to-door canvas ___ Radio ✓ Newspaper ✓
Other ___

2. Phone numbers for emergency services:
Police: 911 Fire: 911 Ambulance: 911
County Director of Emergency Services (Name and number)
Dale Petry 304-746-7911

3. Name, location, and phone number of person(s) that the consumer should notify regarding a potential problem so that the operator can assess the potential problem and notify the appropriate parties:
American Water call center 1-800-685-8660

4. This plan will be reviewed every five (5) years. The revised plan will be dated and distributed to the following: Plant staff and selected management staff

5. The most likely causes of a water disruption are: Drought ___ Contaminant spill ___ Flooding ✓
Other Main breaks

6. Short-term alternative sources of water are:
___ Locally purchased bottled water ___ Backup well
✓ Transported by (name and phone) West Virginia American Water personnel
___ Other ___

7. Long-term alternative sources of water are: None
___ Another intake or well (Is this intake or well available for use?) Yes___ No___
___ Connection to another system (name) ___
___ Other ___

8. Intake shut down is the responsibility of Local utility management

9. A list of possible contractors needed during an emergency is maintained? Yes ✓ No ___ This list is maintained and updated by Risk Management Department

10. Please identify any local source water protection management activities on the list below that you are Planning to do with a (P), Currently doing with a (C), or have Interest in doing with an (I) in your area.
C Risk Management Plans
C Emergency Response Plans
___ Contingency Plans
___ Participate in an early-warning communication network
C Stream monitoring beyond the normal regulatory requirements

_____ Land use measures (i.e. prohibition of various land uses in area, special permitting of land uses, transfer of development rights, growth controls, etc.)
_____ Land or easement acquisitions
__P__ Public education and outreach activities (i.e. signage and stencils for visual awareness of protection areas, and newspaper, radio or TV ads about drinking water) ORSANCO
__C__ Participate in a local source water or watershed committee Little Sandy Creek Watershed
__P__ Review your watershed for potential contaminant sources
_____ Surface water flow modeling

11. Public participation and education will be accomplished by: Word-of-mouth ___
___ Posted notices ___ Public meetings ___ Pamphlets ___ Lectures
_√_ Other CCRs

12. List any additional ideas or explanations of possible source water activities for your area in the space provided below.

This survey was completed on 8-10-2006 by Thomas W Holbrook
Date Signature

Thomas W. Holbrook
Printed Name

Water Quality Manager
Position Title

2008003599 F
Operator Certification Number

## THANK YOU!!!

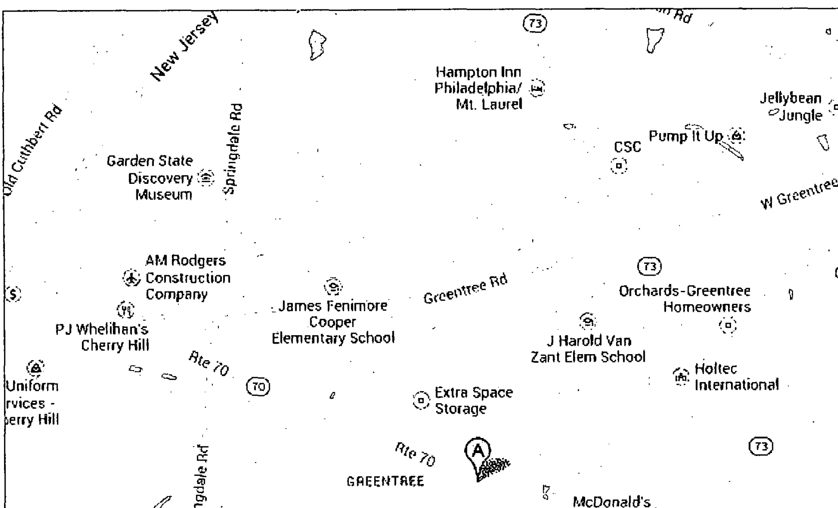
The Source Water Assessment and Wellhead Protection Program is administered by the WV Department of Health and Human Resources, Bureau for Public Health. The **EMERGENCY/CONTINGENCY AND LAND MANAGEMENT PLAN** information provided will be used to update and maintain the currently approved wellhead/source water protection plans and related projects. If you have any questions or comments regarding this survey, please contact Scott Rodeheaver at:

Office of Environmental Health Services
Capitol and Washington Streets
1 Davis Square, Suite 200
Charleston, WV 25301-1798
Phone: 304.558.6713 Fax: 304.558.0324
Email: scottrodeheaver@wvdhhr.org
Website at http://www.wvdhhr.org/oehs/eed/swap/

Ex. 5 - Deliberative

Google

Address **2080 Marlton Pike E**
**Cherry Hill, NJ 08003**



# Ex. 5 - Deliberative

Google

**Ex. 6 - Personal Privacy**

A

**Ex. 6 - Personal Privacy**

77

| | |
|---|---|
| | go 0.2 mi<br>total 0.2 mi |
| | go 0.3 mi<br>total 0.6 mi |
| 77 | go 2.0 mi<br>total 2.6 mi |
| | go 4.1 mi<br>total 6.7 mi |

Ex. 5 - Deliberative

# Ex. 6 - Personal Privacy

Ex. 5 - Deliberative

- Recipe index
- Recipe box
- Giveaways

- About
  - About the authors
  - FAQ
- Work with us
- Contact

# Gimme Some Oven

- FILM
- LIFE
- 
- READS

# Ex. 5 - Deliberative

Ex. 5 - Deliberative

Ex. 6 - Personal Privacy

## Casillas, Laura

**Subject:** Charleston Chemical Leak General Brief
**Location:** Conf Call Ex. 6 - Personal Privacy

**Start:** Tue 1/14/2014 9:00 AM
**End:** Tue 1/14/2014 10:00 AM

**Recurrence:** Weekly
**Recurrence Pattern:** every Monday, Tuesday, Wednesday, Thursday, and Friday from 9:00 AM to 10:00 AM

**Meeting Status:** Meeting organizer

**Organizer:** Casillas, Laura
**Required Attendees:** Matlock, Dennis; Ventura, Dominic; Fran Burns; Williams, Jacqueline; Smith, Bonnie; Kelly, Jack (R3 Phila.); Ferrell, Mark; Wisniewski, Patti-Kay; binetti, victoria; Daniel, Kevin
**Optional Attendees:** Wright, Dave; Santiago, Cindy; Matsinger, Josie; Werner, Lora; Markiewicz, Karl; Steuteville, William; Armstrong, Joan; Welsh, Mike; Rose, Kenneth; Taylor, Trish; Marzulli, Linda; Miller, Linda; Price-Fay, Michelle

Purpose of this meeting is general operational and regulatory awareness WITHIN EPA REGION 3 response parties. Please share accordingly.

AGENDA

Roll Call-PSC (Laura Casillas)
Ground Rules-PSC
Review Agenda-PSC

1. Incident Commander/OPS (Dennis Matlock/Dom Ventura):
    a. Current response actions and accomplishments
    b. Safety Issues
2. Regional Incident Commander (Fran Burns):
    a. Reviews Key Decisions Priorities, Constraints and Limitations
    b. Discusses Incident Objectives
    c. Reviews Key Procedures
    d. Assigns/Reviews Functional Tasks
3. FSC (Jackie Williams)-finance issues
4. PIO (Bonnie Smith) -public affairs issues
5. LNO (Mark Ferrell)-interagency issues
6. PSC-facilitates open discussion to:
    a. Clarify priorities and objectives
    b. Review Concerns/Issues
        i. Regulatory Programs-Enforcement
    c. Review Assignments/Open Actions/Tasks

35TH CST (WMD) SAMPLE LOG FOR WV AMERICAN WATER INCIDENT As of: 1/11/2014 19:00

| SAMPLE LOCATION / COUNTY | DTG | SAMPLE NUMBER | SAMPLE TEAM | RAW INTAKE RESULTS | FINISHED WATER RESULTS |
|---|---|---|---|---|---|
| WVAW / Kanwaha | 101230RJAN14 | 12:30 | WVAMW | 1.04 PPM | 1.021 PPM |
| | | | | 3.35 PPM | 1.56 PPM |
| WVAW / Kanwaha | 101355RJAN14 | 13:55 | WVAMW | 1.229 PPM | 0.906 PPM |
| | | | | 1.19 PPM | 1.3 PPM |
| WVAW / Kanwaha | 101600RJAN14 | 16:00 | WVAMW | 1.222 PPM | 0.856 PPM |
| | | | | 1.39 PPM | 1.23 PPM |
| WVAW / Kanwaha | 101755RJAN14 | 17:55 | WVAMW | 0.802 PPM | 0.777 PPM |
| | | | | 1.27 PPM | 1.28 PPM |
| WVAW / Kanwaha | 101950RJAN14 | 19:50 | WVAMW | 0.785 PPM | 0.809 PPM |
| | | | | 2.2 PPM | 2.4 PPM |
| WVAW / Kanwaha | 112300RJAN14 | 23:00 | WVAMW | 1.70 PPM | 0.75 PPM |
| | | | | | |
| WVAW / Kanwaha | 110100RJAN14 | 1:00 | WVAMW | 1.647 PPM | 0.628 PPM |
| | | | | | |
| WVAW / Kanwaha | 110300RJAN14 | 3:00 | WVAMW | 1.081 PPM | 0.649 PPM |
| | | | | | |
| WVAW / Kanwaha | 110500RJAN14 | 5:00 | WVAMW | 1.87 PPM | 1.01 PPM |
| | | | | | |
| WVAW / Kanwaha | 110700RJAN14 | 7:00 | WVAMW | 1.30 PPM | 1.10 PPM |
| | | | | | |
| WVAW/Kanawha | 110902RJAN14 | 9:02 | WVAMW | 0.70 PPM | 0.60 PPM |
| | | | | | |
| WVAW / Kanwaha | 111000JAN14 | 10:00 | WVAMW | 0.488 PPM | 0.622 PPM |
| | | | | | |
| WVAW/Kanawha | 111415RJAN14 | 14:15 | WVAMW | 0.8 PPM | 0.30 PPM |
| | | | | | |

**Charleston, WV Chemical Leak**
**USEPA Region 3**
**Concept of Operations Document– EPA ConOps**
**January 11, 2014**

**Operational Period: January 12, 2014: 800hrs-January 19, 2014: 0759hrs**
**24 Hour Number: 215.814.3255**
**24 Hour National Response Center Number – 800. 424. 8802**
**(to report new and oil or hazardous substances release)**
**www.epaosc.org/charlestonwvchemicalleak**

Key Participants:

EPA Federal On-Scene Coordinator (FOSC) – EPA's Incident Commander is Dennis Matlock

Other USEPA
- Region 3 Incident Management Team (IMT)
- Special Teams
  - EPA Environmental Response Team (ERT)
  - EPA Office of Ground Water and Drinking Water Development (ORD)
  - Regional Water Protection Division Water Program (WPD)
  - EPA Region 3 Laboratory
- Contracted Resources
  - Superfund Technical Assistance and Response Team Contractor (START)
  - Emergency Response and Removal Services Contractor (ERRS)
  - Contract Laboratory Network

Agency for Toxic Substances and Disease Registry (ATSDR)

A. Purpose:

The U.S. Environmental Protection Agency (EPA) Region 3 Office of *Preparedness and Response (OPR)* maintains response capabilities, through the authorities of the FOSC, to respond to a release and/or a threatened release of oil and hazardous substances 24 hours a day, 365 days per year. The activities associated with the Charleston, WV Chemical Leak (CWVCL) are complex enough to merit EPA to deploy these capabilities so response actions can occur in a timely manner.

B. Communications:

Requests for EPA support should come the EPA R3 Regional Operations Center (EPA3 REOC) Phone Duty Officer using the 24 hour Number: 215.814.3255

C. Implementation:

The assets described below in this document:

- Are available to support the State of West Virginia in its response to the release, and in its restoration of water systems to a healthy functioning state.
- Can be deployed under the EPA FOSC's authority per the National Contingency Plan (NCP) in service of the State directly, and/or under the National Response Framework in support of FEMA Mission Assignments.
- Are both regional and national and may be obtained through EPA Special Teams under the National Contingency Plan (NCP), but are coordinated thru the EPA FOSC (IC).
- May be accessed by contacting the **24 Hour EPAR3EOC Number: 215.814.3255**.

EPA's Region 3 Incident Management Team (IMT) is supporting FOSCs (who are located on scene) from the EPA3 REOC, located in Philadelphia, PA.

EPA oil and hazardous substance response support is provided by EPA On-Scene Coordinators (FOSCs) who coordinate and direct response to releases of hazardous substances and discharges of oil to navigable waters *as authorized by the National Contingency Plan (NCP)*. The EPA FOSC will coordinate all EPA resources including its special teams.

If FEMA issues a pending EPA a mission assignment, then these same EPA resources will be available for Emergency Support Function #10 response pursuant to the National Response Framework. The EPA resources will be integrated into the FEMA Consequence Management Branch and will be staged or managed from the Incident Command Post, per EPA FOSC determination.

EPA R3 is prepared to send additional, comparable resources however they are needed as the incident changes.

D. EPA R3 Assets and their Capabilities:

The **FOSC**, are on scene responding pursuant to the NCP. They have the capabilities to address hazardous substance mitigation, environmental sampling and analysis, direct read-out air monitoring support, personnel decontamination support and other similar assistance. They also have the ability to respond more broadly under a FEMA mission assignment which is pending FEMA approval.

The **EPA3 REOC**, located in Philadelphia, is supporting the Response. The REOC can provide backup resources, technical information and coordinate with EPA HQ in Washington DC. These resources include:

- Additional FOSC support.
- A fully trained EPA R3 Incident Management Team (IMT).
- The Response Support Corps (RSC), a cadre of program/media trained professionals to

augment oversight of field activities and provide experts in specific program fields like drinking water and others;

- Representatives from the Agency for Toxic Substances and Disease Registry (ATSDR) for environmental health assessment and consult purposes;
- Additional public information officer resources for direct assistance to the local health departments;
- Additional support as needed under the NRF.

Analytical Resources:
**EPA Region 3 Laboratories and a Contract Laboratory Network**—The EPA Regional Lab can assist in sample processing and can augment sampling capacities for the response through its laboratory network.

EPA Special Teams:
**EPA Environmental Response Team (ERT)**—has the capacity for mobile multi-media sample screening and real time air monitoring and screening. EPA ERT's Trace Atmospheric Gas Analyzer (TAGA) instruments can measure concentrations of pre-selected industrial compounds in the air at the parts-per-billion level as the bus is being driven down the street;

**EPA Office of Ground Water and Drinking Water Development (OGWDWD)**--Professionals with a focus on drinking water security, distribution system water quality, and monitoring for contamination incidents.

**Water Protection Program (WPD)**--Water Protection Program personnel are available on reach back or on the ground capacity to provide technical guidance on water safety concerns to facilities, local health departments and others.

**Contracted Resources**:

Superfund Technical Assistance and Response Team Contractor (START) and Superfund Emergency Response and Removal Services Contractor (ERRS) EPA contractors are ready to deploy their technical air monitoring, data management, and heavy earth moving equipment.

D. Outreach:

EPA has and will provide **Liaison Officers (LNOs)** where requested either by FEMA/DHS or Local Governments. At this time our LNO is actively maintaining the EOC informed of local needs and press briefings.

EPA has and will provide **Public Information Officers (PIO)** available to augment the capacity of local health departments to reach large numbers of public.

dep

west virginia department of environmental protection

Division of Air Quality
601 57th Street SE
Charleston, WV 25304
Phone: 304 926 0475 • FAX: 304 926 0479

Earl Ray Tomblin, Governor
Randy C. Huffman, Cabinet Secretary
www.dep.wv.gov

January 10, 2014

CERTIFIED MAIL
Article # 91 7108 2133 3938 4325 3058

Freedom Industries, Inc.
Mr. Gary Southern, President
P.O. Box 713
Charleston, WV 25328

RE: NOTICE OF VIOLATION(S)
Freedom Industries, Inc.
WV ID# 039-00035

Dear Mr. Southern:

On January 9, 2014, an odor investigation was conducted in public areas along the I-77 corridor, north of Bigley Ave. to south of the I-77/I-79 split, by personnel of the Division of Air Quality (DAQ). The investigation was prompted by citizen complaints of objectionable odors in those areas, which are near and downriver of the Freedom Industries, Inc. The investigation established that Freedom Industries, Inc. facility located in Charleston, WV is in violation of the West Virginia Code §§ 22-5-3 for causing statutory air pollution by discharging into the air MCHM. Also, Freedom Industries, Inc. is in violation of 45 CSR 4, in particular, Section 3.1, which states "No person shall cause, suffer, allow or permit the discharge of air pollutants which cause or contribute to an objectionable odor at any location occupied by the public." Specifically, objectionable odors were determined to be in public areas at intersections including Bigley Ave. & Westmoreland Dr. and Bigley Ave. & Pennsylvania Ave. Following the aforementioned odor patrol, DAQ personnel discovered that the source of these odors were from a continuously leaking Crude MCHM Tank (No. 396) at the Freedom Industries, Inc. facility. Upon arrival at Freedom Industries, Inc. facility at 11:10 am, 01/09/2014, DAQ personnel discovered that no spill containment measures had been initiated and that an accumulating MCHM leak pool was seeping thru a dike wall adjacent to the Elk River and a downriver oil sheen was observed.

You should be aware that for each violation your Company may be subject to civil and/or criminal penalties and further action or remedies as provided by West Virginia Code §§ 22-5-6, which may include imposition of a civil penalty of up to ten thousand ($10,000) dollars per day for each violation.

A written response to this Notice of Violation is required from your Company within 30 days after receipt. The following information must be in your response to the Notice of Violation:

(1) A detailed explanation of the cause(s) of the condition(s) leading to the cited violation or a description of the action(s) being taken or to be taken to ascertain the cause(s) for noncompliance.

(2) A statement of how long the condition(s) has existed.

(3) A detailed explanation of the remedial measures that have been taken and will be taken to address the causes of noncompliance. For any remedial measure(s) not yet taken, provide expected date(s) for completion. If all remedial measures have been completed, provide the date that the Company believes that compliance with air quality requirements was achieved.

Please be aware that any person who knowingly misrepresents any material fact in an application, record, report, plan, or other document filed or required to be maintained under the provisions of West Virginia Code 22-5-1, et seq., or any rules promulgated thereunder, is guilty of a misdemeanor and, upon conviction, shall be fined not more than twenty-five thousand ($25,000) dollars or imprisoned in the county jail not more than six months or both fined and imprisoned.

Furthermore, any person who knowingly violates any provision of West Virginia Code 22-5-1, et seq., any permit or any rule or order issued pursuant to that article is guilty of a misdemeanor and, upon conviction, shall be fined not more than twenty-five thousand ($25,000.00) dollars for each day of such violation or imprisoned in the county jail not more than one year or both fined and imprisoned.

Further, please note that for purpose of the foregoing, violations on separate days are separate offenses.

The Division looks forward to your timely written response to this Notice of Violation.

John A. Benedict
Director

cc:

Mr. Dave McCombie
Chemstream
166 Commerce Drive
Stoystown, Pa, 15563

Andrew G. Fusco
2400 Cranberry Square
2nd Floor
Morgantown, WV 26508-9209

dep

west virginia department of environmental protection

Division of Water and Waste Management
601 57th Street SE
Charleston, WV 25304
Phone: (304) 926-0495
Fax: (304) 926-0463

Earl Ray Tomblin, Governor
Randy C. Huffman, Cabinet Secretary
www.dep.wv.gov

# ORDER
# ISSUED UNDER THE WATER POLLUTION CONTROL ACT WEST VIRGINIA CODE, CHAPTER 22, ARTICLE 11 AND THE GROUNDWATER PROTECTION ACT WEST VIRGINIA CODE, CHAPTER 22, ARTICLE 12

TO: Etowah River Terminal, LLC.
Attn: John Hutchinson, Terminal Manager
P.O. Box 713
Charleston, WV 25323

DATE: January 10, 2014

ORDER NO.: 8027

## INTRODUCTION

The following findings are made and Order issued to Etowah River Terminal, LLC pursuant to the authority vested in the Director of the Division of Water and Waste Management under Chapter 22, Article 11, Section 1 et seq. and Chapter 22, Article 12, Section 1 et seq. of the Code of West Virginia.

## FINDINGS OF FACT

In support of this Order, the Director hereby finds the following:

1. Etowah River Terminal, LLC operates a bulk storage distribution center located near Charleston, Kanawha County, West Virginia. Etowah River Terminal, LLC was reissued permit coverage under WV/NPDES General Water Pollution Control Permit No. WV0111457, Registration No. WVG610920 on November 17, 2009.

2. On January 9, 2014, West Virginia Department of Environmental Protection (WVDEP) personnel received a complaint concerning an odor at / near Ettowah River Terminal, LLC. After investigation, the following was observed and documented:

   a. Free product was observed in secondary containment units surrounding above ground storage tanks containing a chemical described as 4-Methylcyclohexne Methanol. It was also observed that this material had escaped the secondary containment unit and had entered the Elk River. Failure to maintain adequate secondary containment for above ground storage tanks is a violation of 47 CSR 58, Section 4.8.a.

b. It was determined that the intake for the local public water supply is located approximately 1.5 miles downstream of the discharge, and has been impacted.
c. The release of this spilled material has caused conditions not allowable in the Elk River by creating odors in the vicinity of state waters, by requiring an unreasonable degree of treatment for the production of potable water, and by creating a sheen on the surface of the water, a violation of 47 CSR 2, Section 3.
d. Ettowah River Terminal, LLC has failed to take any and all measures necessary to contain the spill and render it harmless, a violation of 47 CSR 11, Section 2.5.

3. At 12:05 p.m. on January 9, 2014, Bob Reynolds with Freedom Industries reported the spill to the Emergency Response Spill Hotline. Mr. Reynolds indicated that the facility discovered a hole in the tank; as well as, the secondary containment unit was containing the spilled material.

## ORDER FOR COMPLIANCE

And now, this day of January 10, 2014, Etowah River Terminal is hereby ORDERED by the Director as follows:

1. Ettowah River Terminal, LLC. shall immediately take measures to initiate compliance with all terms and conditions of its permit and pertinent laws and rules.

2. Ettowah River Terminal, LLC. shall immediately **Cease and Desist** any further receipt of material to be stored within the area of the faulty secondary containment.

3. Ettowah River Terminal, LLC shall immediately take all necessary measures to contain, recover and remediate the material that has escaped the breached above ground storage tank and the secondary containment structure; which shall at a minimum include the installation of interceptor trenches adjacent to the Elk River, and the installation and maintenance of booms and absorbents in affected waterways.

4. Ettowah River Terminal, LLC. shall immediately conduct an integrity test of all above ground storage tanks and secondary containment structures for the entire facility.

5. Prior to resuming receipt of material to be stored, Ettowah River Terminal, LLC. must provide a report for approval which documents that the integrity of all storage and containment structures are sound.

## OTHER PROVISIONS

1. Compliance with the terms and conditions of this Order shall not in any way be construed as relieving Ettowah River Terminal, LLC of the obligation to comply with any

applicable law, permit, other order, or any other requirement otherwise applicable. Violations of the terms and conditions of this Order may subject Ettowah River Terminal, LLC to additional enforcement action in accordance with the applicable law.

2. The provisions of this Order are severable and should a court or board of competent jurisdiction declare any provisions to be invalid or unenforceable, all other provisions shall remain in full force and effect.

3. This Order is binding on Ettowah River Terminal, LLC, its successors and assigns.

4. This Order shall terminate upon Ettowah River Terminal, LLC's notification of full compliance with the "Order for Compliance" and verification of this notification by WVDEP.

## RIGHT OF APPEAL

Notice is hereby given of your right to appeal the terms and conditions of this Order which you are aggrieved to the Environmental Quality Board by filing a NOTICE of APPEAL on the form prescribed by such Board, in accordance with the provisions of Chapter 22, Article 11, Section 21 and/or Chapter 22, Article 12, Section 11 of the Code of West Virginia within thirty (30) days after receipt of this Order.

This Order shall become effective upon receipt.

Scott G. Mandirola, Director
Division of Water and Waste Management

*revised March 2013*

# Ex. 5 - Deliberative

# Ex. 5 - Deliberative

# Ex. 5 - Deliberative

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Ex. 5 - Deliberative

# Ex. 5 - Deliberative

# HOW TO FLUSH PLUMBING APPLIANCES AND FAUCETS

WEST VIRGINIA AMERICAN WATER

Once you've flushed your hot and cold water faucets, be sure to take these additional steps to flush plumbing appliances. To protect the health and safety of our communities, we recommend that you read carefully and follow the steps for flushing. Thank you for your cooperation.

- **Ice makers**
  If you have an ice maker in your refrigerator, first throw away all ice and then:

  **If you have a filter on your ice maker:** Some refrigerators, which have ice makers, also have filters on the small water line that feed the ice maker. If you have or use filters on your ice maker, you want to replace the filter **AFTER** flushing your refrigerator's ice maker. These filters require routine replacement. This would be a good time to replace the filter to ensure that the water line to the ice maker is completely flushed. Some refrigerators also provide filtered cold water. Check to make sure that you have replaced any filter **AFTER** flushing that is associated with the cold water supply. Then flush cold-water dispenser for five minutes.
- After flushing all of the other plumbing, let the ice maker container fill up completely and discard this ice and clean the container before replacing. If you have more than one refrigerator make sure you perform the same procedure on those units as well.
- **Dishwashers and washing machines-** Dishes and clothes that were washed during the DO NOT USE order should be rewashed. After flushing hot water pipes and water heater, run dishwasher and washing machine empty one time.
- **Humidifiers, CPAP and other devices**
  Throw away any water used in humidifiers, Continuous Positive Airway Pressure (CPAP), oral, medical or healthcare devices, and rinse the device with clean water.
- **Baby formula, food or drinks made with water during the DO NOT USE**
  Be sure you have thrown away any baby formula or other foods prepared with water on the days of the DO NOT USE. This includes drinks like Gatorade made with powder or concentrate.
- **Water filters**
  Clean or change your water filter, or contact the filter manufacturer for more details.
- **Water supplies for pets**
  Pets need clean water too. Be sure to empty all water bowls, bottles, or other water supplies for your pet. After flushing your water system, wash the pet bowl, bottle or other water supply. Then refill with tap water.
- **Point of entry/point of use devices (this may not apply to all customers)**
  If you have a Point of Entry water treatment system such as a water softener or filter, which all of the home's water passes through before it enters the main plumbing system, you should consider the following general guidelines before completing your household plumbing flushing.

*(Continued on page 3)*

**For more information**

Please contact our 24-Hour Customer Service Center at 1-800-685-8660 or visit **www.westvirginiaamwater.com.**

# HOW TO FLUSH YOUR PLUMBING SYSTEM

WEST VIRGINIA
AMERICAN WATER

Following are step-by-step procedures customers can use to flush their plumbing system. To protect the health and safety of our communities, we recommend that you read carefully and follow the steps for flushing. Thank you for your cooperation. **NOTE: After flushing, your water filters need to be replaced. If you have any point of entry water treatment system such as a water softener or filter, please refer to "How to Flush Plumbing Appliances and Faucets."**

West Virginia American Water will be offering residential customers a credit of 1000 gallons, which is more than what will likely be required to flush the average residential home. The average residential customer uses approximately 3,300 gallons per month.

## How to flush your plumbing system

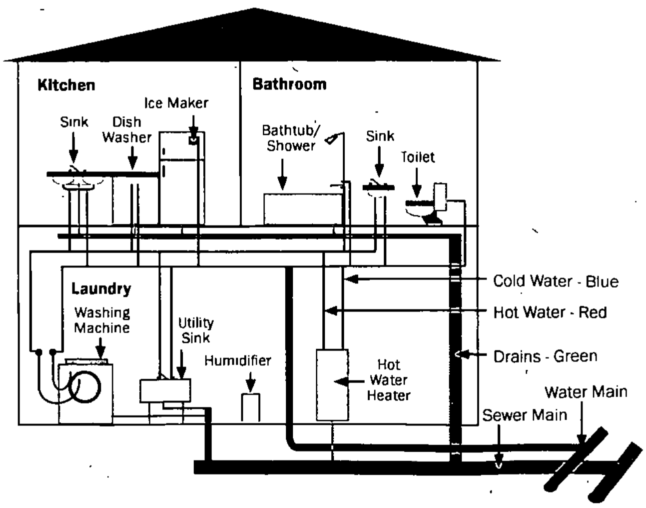
**Please complete these steps in the order set out below. Finish each step completely before moving on to the next step.**

**1 Flush ALL hot water taps for 15 minutes**
Begin the flushing procedure by opening the hot water taps in your bathroom(s). Open ALL hot water lavatory (sink) fixtures, hot water bath fixtures, and any other hot water fixtures, such as kitchens, wet bars, etc. **Run these hot water fixtures for at least 15 minutes. Shut water off after 15 minutes.** After you have flushed each hot water faucet for 15 minutes, your hot water heater will be safe for use.

**2 Flush ALL cold water taps for five minutes**
Once the hot water tank and hot water piping have been flushed, open ALL of the cold water fixtures, flush each toilet at least one time. **Run these cold water fixtures for at least five minutes. Shut water off after five minutes.** This does include the water in your refrigerator water dispenser.

**3 Flush ALL remaining faucets and appliances**
(Before starting step 3, please see **How to Flush Plumbing Appliances and Faucets** for more information.) Open any remaining fixtures such as hose bibs, external faucets or fixtures not used for drinking for at least five minutes to finish the plumbing system flushing. Take additional steps to remove water from other appliances. See **How to Flush Plumbing Appliances and Faucets** for more information. This includes:

- Ice makers
- Dishwashers
- Washing machine
- Humidifiers
- Continuous Positive Airway Pressure (CPAP)
- Oral, medical or health care devices
- Baby formula, food and drinks made with water during DO NOT USE
- Water filters
- Water softeners
- Reverse osmosis units




**Any lingering smell, which is expected, is not a health issue.**

**For more information**: Please contact our 24-Hour Customer Service Center at 1-800-685-8660 or visit our website at **www.westvirginiaamwater.com.**

# HOW TO FLUSH PLUMBING APPLIANCES AND FAUCETS

WEST VIRGINIA AMERICAN WATER

- **Water softeners:** Household water softener, which uses a natural or synthetic resin material to exchange sodium for calcium and magnesium present in the water, should be manually regenerated before flushing your plumbing system. This will ensure that the softener resin has been backwashed and cleaned before flushing procedures begin. If you are unsure of how to manually initiate a regeneration cycle, refer to your softener owner's manual or call you equipment supplier for assistance.
- **Sediment Filters:** Household water filters usually fall in two basic categories:
    - Pressure filters, which can be backwashed to clean
    - Cartridge filters, which have a replaceable element or cartridge

  If your home has a pressure filter that can be backwashed, you should initiate a manual backwash of the filter before proceeding with, and after completing, the flushing procedures. If you have a whole house cartridge filter system, you should replace the cartridges after completing the flushing procedures.
- **Point of use filters/treatment:** If you have or use Point of Use filters, which are typically attached to your kitchen faucet you should replace the filter before using the faucet-connected unit. These filters require periodic replacement anyway so this would be a good time to do this.
- **Reverse Osmosis:** Reverse Osmosis drinking water treatment systems often have pre-filters, which you may want to replace before flushing the RO System. However the actual Reverse Osmosis membrane module should not require replacement. If the manufacturer of the membrane suggests that you replace this part of the system you should ask them to give you the specific reasons why.

**For more information**

Please contact our 24-Hour Customer Service Center at 1-800-685-8660 or visit our website at **www.westvirginiaamwater.com**.

01-12-2014

## NEW - How Will the Elk River Spill Affect the Cincinnati Area?

Click below to learn more about how the Elk River Spill will affect the Cincinnati area and how ORSANCO is monitoring the movement of the spill to protect your drinking water:

Elk River Spill Information (.pdf)

| Projected Arrival Times: | Projected |
|---|---|
| Spill Time: | Thurs. 1/9/14 -10 AM |
| Arrival Time at Ohio River: | Sat. 1/11/14 -11 PM |
| Arrival Time at RC Byrd Locks and Dam: | Sun. 1/12/14 - 5 AM |
| Arrival Time at Huntington: | Sun. 1/12/14 - 4 PM |
| Arrival Time at Greenup Locks and Dam: | Mon. 1/13/14 - 5 AM |
| Arrival Time at Maysville: | Tues. 1/14/14 - 10 AM |
| Arrival Time at Meldahl Locks and Dam: | Tues. 1/14/14 - 1 PM |
| Arrival Time at Richard Miller Treatment Plant: | Tues. 1/14/14 - 9 PM |

For more information on ORSANCO's Source Water Protection Program, click here

5735 Kellogg Avenue. Cincinnati, Ohio 45230 : (513) 231-7719 : Fax (513) 231-7761

The Ohio River Valley Water Sanitation Commission (ORSANCO) is monitoring the movement of the Elk River spill, as it flows into and along the Ohio River. The chemical 4-methycyclohexane methnol, known at MCHM, was released into the Elk River, which flows into the Kanawha River, which flows into the Ohio River.

MCHM has been detected in the Ohio River. It was first detected in the Ohio River on Sunday, January 12th at noon. ORSANCO is coordinating with multiple organizations, including Cincinnati Water Works, Northern Kentucky Water, Kentucky Division of Water, US Coast Guard, West Virginia American Water and others to monitor the location of the spill. Field crew members at these organizations are taking water samples of the Ohio River to determine the concentration of the chemical. The sample information is used by these organizations to present the most accurate understanding of the Elk River spill and to protect drinking water use.

***As of 2:00 pm on Monday, January 13, 2014, the chemical's odor was detected at Portsmouth Water, which is located at Ohio River Mile 350.0. Cincinnati is located at Ohio River Mile 463.5.*

If residents in the Cincinnati area have questions about their water, they may contact Cincinnati Water Works at 513-591-7700.

SAMPLE ANALYSIS LOG FOR WV AMERICAN WATER INCIDENT
VARIOUS COLLECTION SITES
AS OF: JAN 12 2014, 1835

| SAMPLE LOCATION / COUNTY | TIME & DATE | SAMPLE NUMBER | SAMPLE TEAM | ANALYSIS TEAM | RESULTS PPM/RECEIVED |
|---|---|---|---|---|---|
| HYD #168 / KANWAHA | JAN 11 257PM | 168 | WVAMW | DHHR | 1.39/ JAN 11 833 PM |
| HYD #168 / KANWAHA | | | | DUPONT | .7/ JAN 11 1012PM |
| HYD #1783 / KANWAHA | JAN 11 315PM | 1783 | WVAMW | DHHR | .76/ JAN 11 833PM |
| HYD #1783 / KANWAHA | | | | DUPONT | .8/JAN 12 158AM |
| HYD #978 / KANWAHA | JAN 11 323PM | 978 | WVAMW | DHHR | .92/ JAN 11 833PM |
| HYD #978 / KANWAHA | | | | DUPONT | .7/ JAN 12 158AM |
| HYD# 1900 DANNER RD | JAN 11 321PM | 1900 | WVMW | DHHR | .76/ JAN 11 833PM |
| HYD# 1900 DANNER RD | | | | DUPONT | .6/JAN 12 158AM |
| Ex. 6 - Personal Privacy | JAN 11 330PM | 1530 | WVAMW | DUPONT | 1/ JAN 12 158AM |
| HYD# 1418 | JAN 11 4PM | 1600 | WVAW | DUPONT | .9/ JAN 12 158PM |
| HYD# 2071 | JAN 11 5PM | 2071 | WVAM | DHHR | .79/ JAN 12 122AM |
| HYD# 2071 | | | | DUPONT | .8/ JAN 12 158AM |
| HYD # 1167 | JAN 11 424PM | 1624 | WVAW | DHHR | .68/ JAN 11 107AM |
| HYD# 1167 | | | | DUPONT | 1/JAN 11 1012 |
| HYD# 448 | JAN 11 507PM | 1707 | WVAW | DUPONT | 1/ JAN 12 158AM |
| HYD# 1501 | JAN 11 506PM | 1706 | WVAW | DHHR | .93/ JAN 12 107AM |
| HYD# 1501 | | | | DUPONT | .7/ JAN 12 158AM |
| HYD# 986 | JAN 11 418PM | 1618 | WVAW | DHHR | .87/ JAN 12 221AM |
| HYD# 986 | | | | DUPONT | .9/ JAN 11 1012PM |
| HYD# 1084 | JAN 11 450PM | 1650 | WVAW | DHHR | .87/ JAN 12 221AM |
| HYD# 1084 | | | | DUPONT | .9/ JAN 12 158AM |
| HYD# 451 | JAN 11 507PM | 1707 | WVAW | DHHR | .83/ JAN 11 1107PM |
| HYD# 451 | | | | DUPONT | 1/ JAN 11 1012PM |
| RIVER KAN TURNPIKE NEW HYD | JAN 11 537PM | 1737 | WVAW | DHHR | .85/ JAN 12 107AM |
| RIVER KAN TURNPIKE NEW HYD | | | | DUPONT | .82/ JAN 12 158AM |
| HYD# 2809 | JAN 11 550PM | 1750 | WVAW | DHHR | .59/JAN 12 107AM |
| HYD# 2809 | | | | DUPONT | .8/ JAN 12 158AM |
| HYD# 2018 | JAN 11 550PM | 1645 | WVAW | DHHR | .84/ JAN 12 107AM |
| HYD# 2018 | | | | DUPONT | .9/ JAN 11 1012PM |
| HYD# 12530 | JAN 11 801PM | 2001 | WVAW | DHHR | .78/ JAN 12 321AM |
| HYD# 6712 | JAN 11 837PM | 2037 | WVAW | DHHR | .68/ JAN 12 321AM |
| HYD# A 5017 | JAN 11 1004PM | 2204 | WVAW | DHHR | .60/ JAN 12 345AM |
| HYD # 341 | JAN 12 1006AM | 1006 | | MATRIC | 0.496/ JAN 12 209PM |
| HYD # 1026 | JAN 12 1026 AM | 1026 | | MATRIC | 0.046 / JAN 12 238PM |
| HYD # 926 | JAN 12 1050 AM | 1050 | | MATRIC | 0.045 / JAN 12 238PM |
| | | | | MATRIC | 0.021/ JAN 12 |
| HYD #215 | JAN 12 1230PM | 1230 | | DHHR | 0.0 / JAN 12 |
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Freedom_0006024_0421

SAMPLE ANALYSIS LOG FOR WV AMERICAN WATER INCIDENT
VARIOUS COLLECTION SITES
AS OF: JAN 12 2014, 1835

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